

FEBRUARY, 1955

MODERN Machine Shop

A CHALLENGE!

from **LENOX** Hackmaster

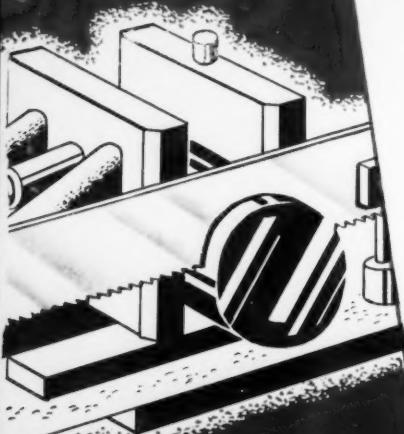
Hackmaster Blades are made to solve the toughest metal cutting problems. Jobs like cutting stainless or titanium . . . jobs that break ordinary blades . . . jobs where safety is a problem.

Special-purpose Hackmaster Blades are *shatter-proof*. They cut straighter, cleaner, and longer. Yet, they cost no more than ordinary power hack saw blades.

Our challenge is simply this: next time you have a metal cutting problem, try welded-edge Hackmaster Blades. *We guarantee that Hackmaster will not be outperformed.*

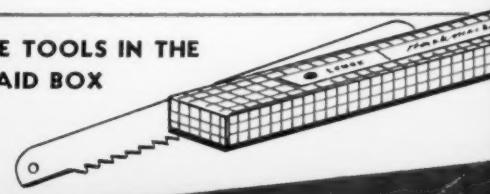
LENOX also presents the famous Mo-Speed Power Blades for spectacular performance on routine metal cutting jobs.

THE TOOLS IN THE PLAID BOX



**AMERICAN SAW
& MFG. COMPANY**
Springfield, Mass.

- HACK SAW BLADES
- HOLE SAWS
- BAND SAW BLADES
- GROUND FLAT STOCK



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More and more carbide engineers and designers are specifying ADAMAS for their tools, dies and wear parts because they know that Adamas Carbide grades are WORK-PROVED. High quality carbide from Adamas is JOB-ENGINEERED to fit both standard and special applications. Delivery is fastest in the industry.

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MODERN Machine Shop

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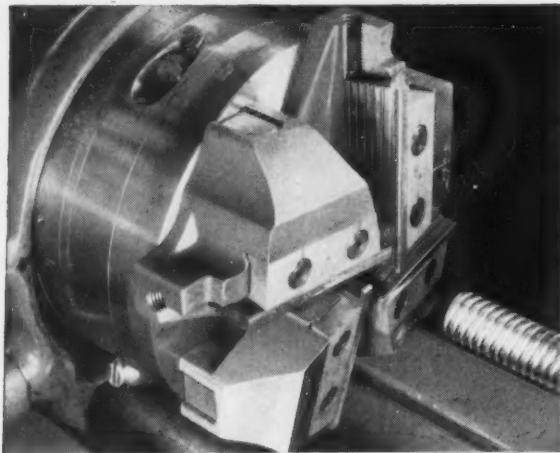
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Member





347 stainless steel— $1\frac{5}{8}$ " Acme threads $15\frac{7}{8}$ " long

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The
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Largest
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Threading
Equipment

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If it were, your LANDMACO Threading Machine would be threading valve stems in $2\frac{1}{2}$ minutes that formerly required nearly $3\frac{1}{2}$ hours. Thread finish and concentricity would be improved. In addition, you could produce many other sizes and types of threads *on this same machine*.

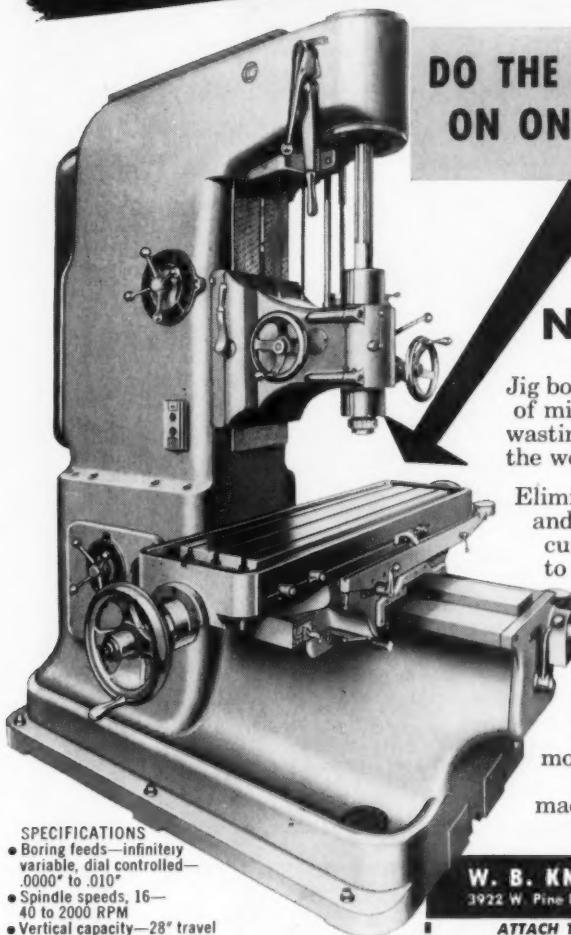
This is one example of the daily performance of LANDIS Equipment in thousands of plants throughout the world. Nearly 350 Threading Machines and Threading Tools comprising the Landis Line will produce all types of internal or external, straight or tapered threads through Cutting—Grinding—Tapping—or Rolling.

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DO THE COMPLETE JOB
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Jig boring *PLUS* a wide range of milling operations without wasting a minute transferring the work to another machine!

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Title.....

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All machines have a wide range of spindle and reciprocation rate. Practically all models are based on 3 steel columns to take the high torque necessary for heavy stock removal.

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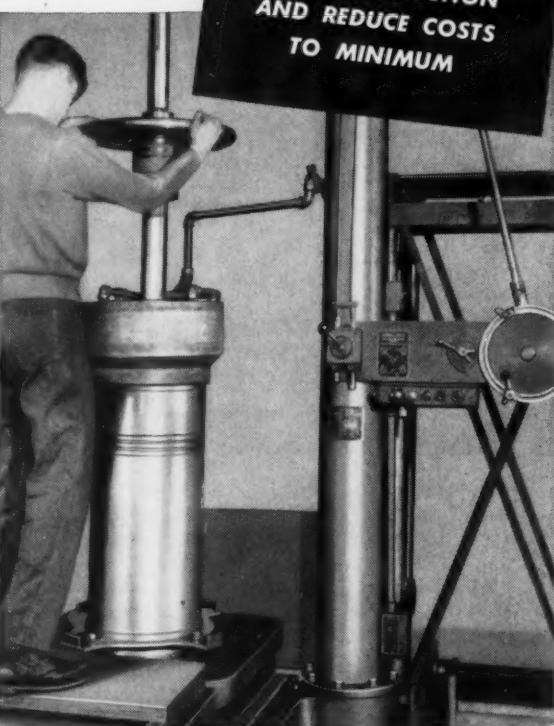


Photo taken in plant of THE HUNT-SPILLER MFG. CORP., BOSTON, MASS.

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Cincinnati 2, Ohio

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GISHOLT type "S"
Balancers

**still simpler operation
with fewer controls... easier readings**

Yes, we've made it possible for you to handle all balancing faster and easier than ever before.

On these improved Type "S" Balancing Machines you have but two operating controls, one for indication of amount and location of required correction in each plane. Amount and location of correction are shown simultaneously—on a uniformly gradu-

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The improved DYNETRIC Type "S" Balancing Machines are offered in both horizontal and vertical models, capable of balancing workpieces ranging from a few ounces to several hundred pounds.

Why not get complete details?

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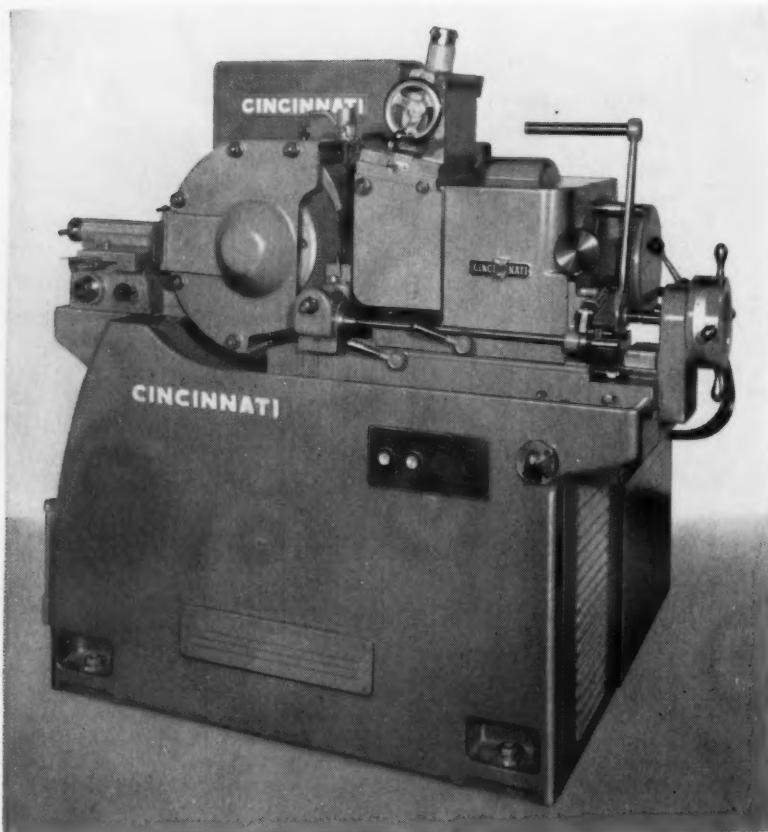
MACHINE COMPANY

Madison 10, Wisconsin



TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

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CINCINNATI

Possibilities

CINCINNATI FILMATIC No. 0 CENTERLESS GRINDERS



CINCINNATI FILMATIC No. 0 Centerless
Grinder. Catalog No. G-640.

In the small parts precision grinding category, a substantial profit potential will be found in the new CINCINNATI FILMATIC No. 0 Centerless Grinder. Exclusive Cincinnati features, based upon 33 years of centerless experience, have been retained: Filmatic grinding wheel spindle bearings; "bed-rock" mounting of grinding wheel spindle; simple, direct truing of wheels. And now Cincinnati offers new advantages such as extra low maintenance with hardened and ground slide-ways and oil-shot lubrication; an extra measure of production with handwheel selection of infinitely variable regulating wheel speeds; higher quality finish and closer limits of accuracy than ever before. Catalog No. G-340 contains the complete story. Write for a copy today.

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**CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPING MACHINES • MICRO-CENTRIC GRINDING MACHINES**

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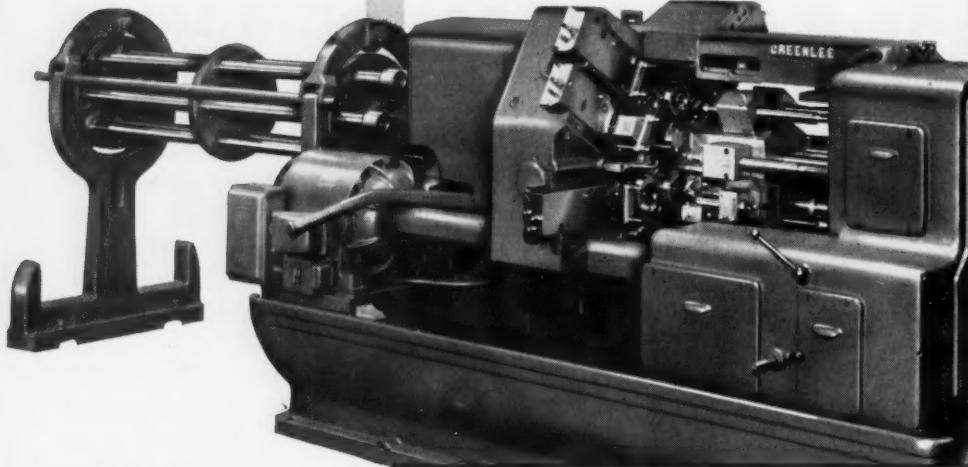
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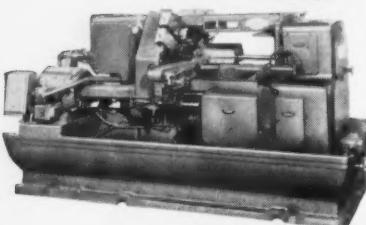
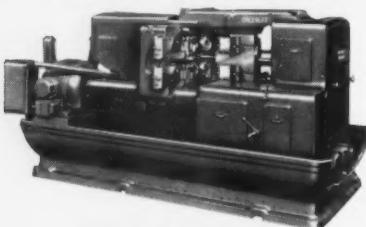
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INCREASE YOUR PRODUCTION...
LOWER YOUR COSTS!

CUT YOUR SET-UP TIME
SPEED-UP DIFFICULT OPERATIONS



**GREENLEE
4-SPINDLE AUTOMATIC**



GREENLEE 6-SPINDLE AUTOMATICS SPECIFICATIONS

Rating	1"	1-5/8"	2"
Chuck Capacity, Round.....	1"	1-5/8"	2"
Chuck Capacity, Hexagon..	7/8"	1-13/32"	1-3/4"
Chuck Capacity, Square....	3/4"	1-1/8"	1-7/16"
Stock Feed.....	6-3/16"	8-5/16"	8-5/16"
Turning Length.....	6"	7-1/2"	7-1/2"
Spindle Speed Range.....	225 to 2500	105 to 2175	95 to 1935
Feed Range per Spindle Rev.	.0014 to .0218	.0017 to .0388	.0019 to .043
Motor Horsepower.....	15	20	25
R. P. M.....	1800	1800	1800
Floor space:			
Length with Stock Reel...	17'-6"	17'-3"	17'-3"
Width.....	5'-0"	5'-4"	5'-4"
Height.....	4'-11"	5'-4"	5'-4"
Net Weight in Pounds.....	14,400	17,940	18,150

GREENLEE 2ND OPERATION AUTOMATIC

Extremely versatile, high-production machines. Parts can be loaded semi-automatically or fully automatically. Incorporates the same basic features... inherent production and operating advantages as the standard 6-Spindle Automatics.

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Now...
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Rockford 3-4881

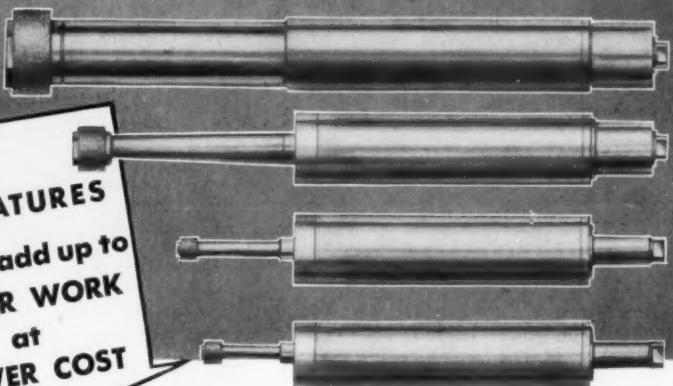
PRODUCTION MACHINERY
GREENLEE
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Specify **POPE** PRECISION INTERNAL SPINDLES

INTERNAL
GRINDING



1. **Increased Production.** Pope Spindles speed up output because they can take heavy cuts.
2. **Increased Wheel Life** because the shaft is rigidly supported by bearings of ample size.
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7. **Dynamic Balance.** Pope Spindles are dynamically balanced with all their rotating parts in full assembly to insure smooth running.

Pope Precision Internal Grinding Spindles come in the sizes, shaft extensions and speeds (up to 35,000 RPM) to meet your every need.

Ask for new catalog No. 57-A

No. 73

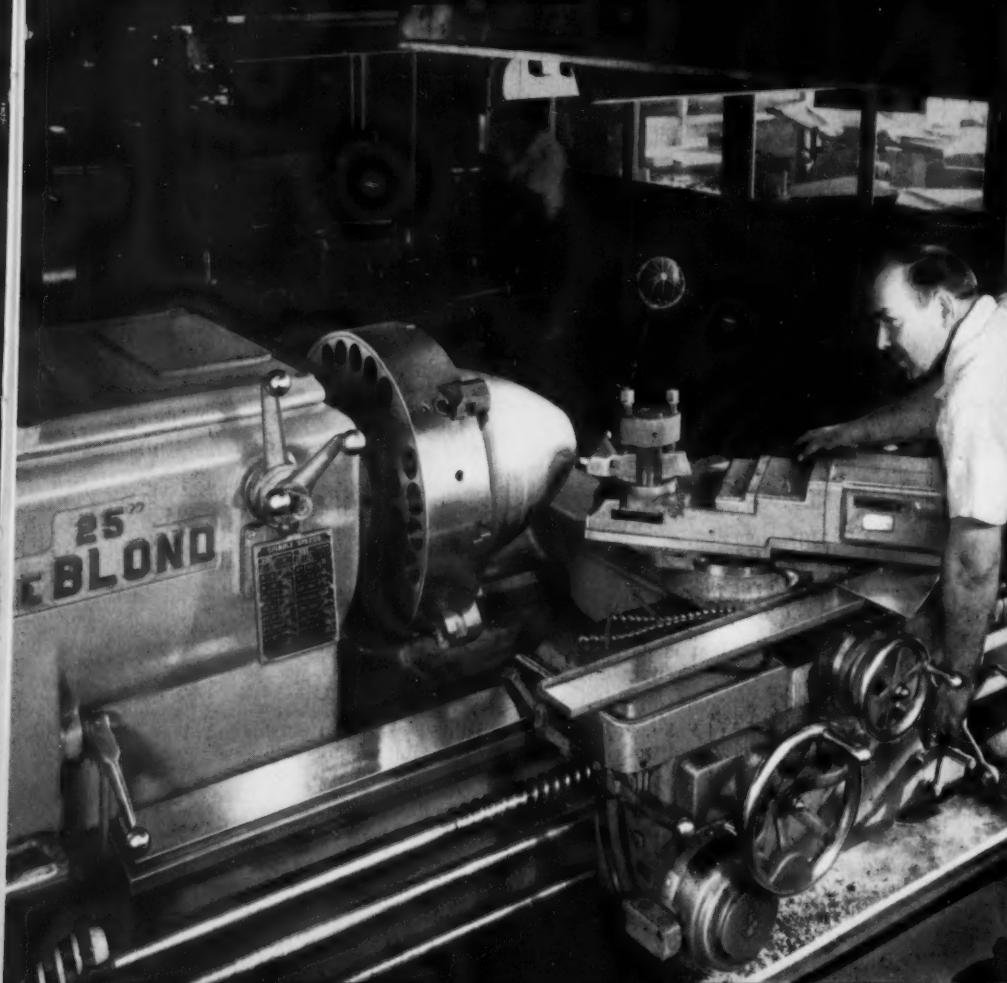
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POPE MACHINERY CORPORATION
ESTABLISHED 1920
261 RIVER STREET • HAVERHILL, MASSACHUSETTS
BUILDERS OF PRECISION SPINDLES

At United Specialties Co. . . .

Here's Diversified Toolroom Turning—



Turning Spin Blocks (dies) for TV Cones—

United uses 24" tool steel blocks to spin their metal TV cones. Large swing capacity in their LeBlond Toolroom lathe allows them to handle these die-turning jobs promptly as they are needed. They get high speed, excellent finish and accurate contours.

from 1000 lb. Spin Blocks to Contoured Stamping Dies

Accomplished with smooth-powered LeBlond 25" Tracing Lathe

Toolroom jobs at United Specialties Co., Chicago, required a big-swing lathe for pieces like heavy spin-blocks, plus convenience and ease of handling on smaller die jobs—many with difficult contours.

Sales engineers at our Chicago Office recommended a LeBlond 25" Heavy-Duty Lathe with Hydra-Trace. It gave United just what they needed—big-swing, smooth power, a lathe that could tackle virtually any of their die-turning jobs.

Mr. M. J. Perkovich, Toolroom Superintendent for United Specialties, says "Our LeBlond Lathe with Hydra-Trace works at least 75% to 175% faster than previous methods. And it completely removes all 'guesswork' on the part of our operators when shapes and radii are involved."

In the toolroom or on the production line, you can count on LeBlond Heavy-Duties with Hydra-Trace to have plenty of "beef" for heavy hogging, plenty of accuracy for extra-fine finish. And they're ideal for complex contour and angle work. Hydra-Trace attachment is easily and quickly installed or removed. Gives maximum flexibility of adjustment for best working angle.

LeBlond Heavy-Duty features include: 4-direction power rapid traverse built into apron; one-piece double-wall apron, hardened rack; totally-enclosed quick-change box; hardened and ground replaceable steel bed ways; thrust lock tailstock. See your LeBlond Distributor today or write for bulletin HD 155T-E.



Turning mating dies for stamped air-cleaner parts—United stamps out complicated ridged and contoured air-cleaner parts, in many sizes and shapes. In each case, mating "re-draw and size" dies are needed. Die shown above, for instance, has 11" O. D. with complex contours and angles, calling for tool "dive-in" on some surfaces. As a result, top cutting speeds cannot be used. United happily found that their LeBlond 25" gives them all the power they need, even at low rpm—with no stalling, no shakes and jitters, no ruined dies or frayed tempers.

Hydra-Trace (Trade Mark, Registered U. S. Pat. Office) is LeBlond's heavy-duty hydraulic tracing attachment. Can be mounted in place of the compound rest on practically all LeBlond Lathes.

.... cut with confidence

LEBLOND
of Cincinnati

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WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • FOR MORE THAN 67 YEARS.



milling, drilling, tapping machine yields

Can you afford to ignore an investment that returns 100% in less than a year? It doesn't seem likely, yet many plant operators hold down milling, drilling, and tapping operations to the capacity of standard machines.

In contrast, the owner of this Avey production machine made high returns on this cast iron pump body (it may be similar to yours): 1 operator instead of 6; floor space cut from 600 to 180 sq. ft.; time per part from 5 minutes to 42 seconds. Put these figures in profit-and-loss terms and you see why the Avey machine pays off so fast.

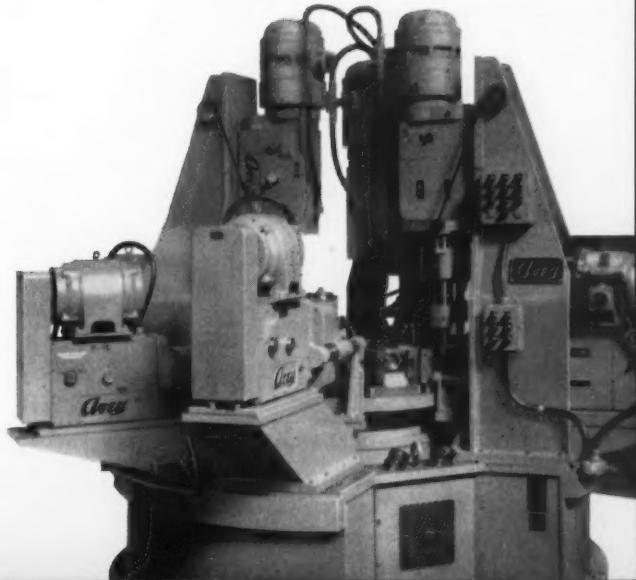
► *This machine has now been re-engineered for a different part—so economically that even higher gains are expected this year.*

Whatever your cash situation, new tax laws and Avey's pay-as-you-produce plan enable you to make this fast-earning investment now. Send a print of your part, state desired production rate, and ask Avey for a *profit prediction*. ◀

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CINCINNATI 1, OHIO

drilling, tapping, production machines

93.4% the first 9 months



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in PLUNGE FORM GRINDING



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- Automatic trueing device with controlled dressing.
- Automatic or manual handling.
- Complete versatility — chucking work, center work or shoe-type grinding; crush wheel or diamond trueing.
- Compact design — affords exceptional accessibility and simple set-ups.



Write for illustrated folder — gives complete specifications and examples of how the Model "E" does jobs faster, better and more economically.

JONES & LAMSON

JONES & LAMSON MACHINE CO., 521 Clinton St., Dept. 710, Springfield, Vt., U.S.A.



Machine Tool Craftsmen
Since 1835

MACHINE TOOL DIV.

Columbia

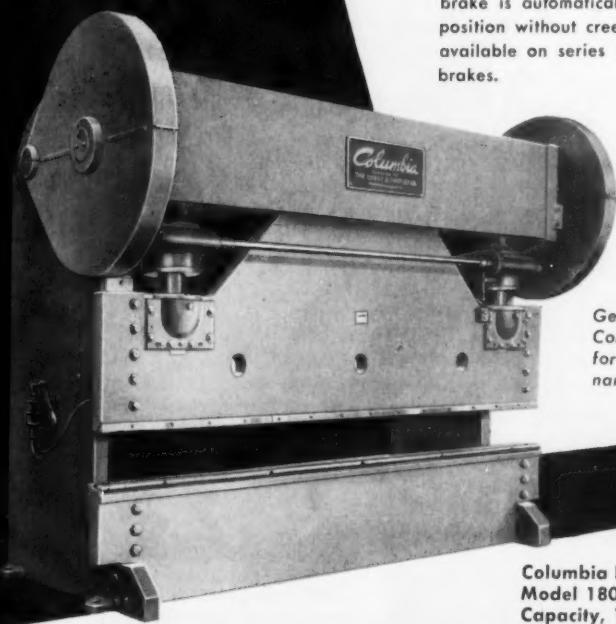
press brake features



a specially designed air clutch and brake

Self-adjusting clutch, installed in heavy, balanced flywheel, cushions shock, assures long, trouble-free service. Multiple spring-loaded brake stops ram automatically when clutch is disengaged.

jogging or
one stroke
...it's
trouble-free



Columbia "New Series" Power Press Brakes incorporate years of experience in the heavy metal working field with time, labor and cost-saving features of the most advanced design.

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Model 180-12.
Capacity, 12' x 1/4".

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DIVISION

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FLEXIBLE SHAFT EQUIPMENT

WITH

Power THAT KEEPS ITS **distance**

... gives jobs like these
quality with quantity!



Choice of Mountings
Suspended,
Bench or Pedestal

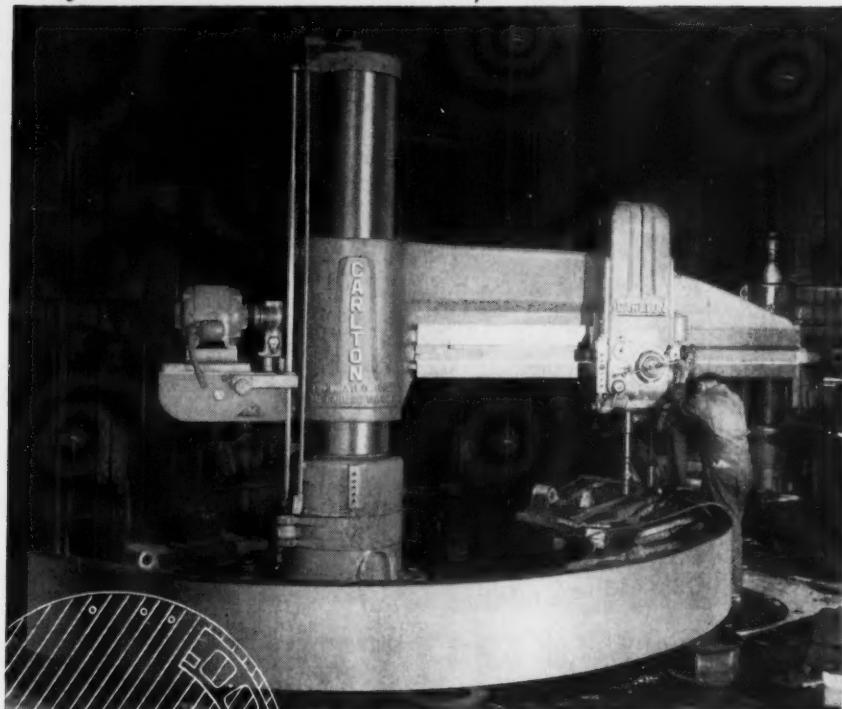


Whatever the job — grinding, sanding, buffing, polishing, filing, brushing or deburring — Haskins equipment handles it easily, quickly, economically and profitably. Haskins equipment provides plenty of out-of-the-way power for even the most sustained operations . . . with a minimum of operator fatigue. That's why, for over 36 years now, the nation's finest and largest (and most profit-conscious) metal working plants rely on Haskins as standard equipment.

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*Only **ONE** can be called the finest.....*



CARLTON GETS AROUND...

**...drills even the most difficult
jobs easily, quickly and efficiently**

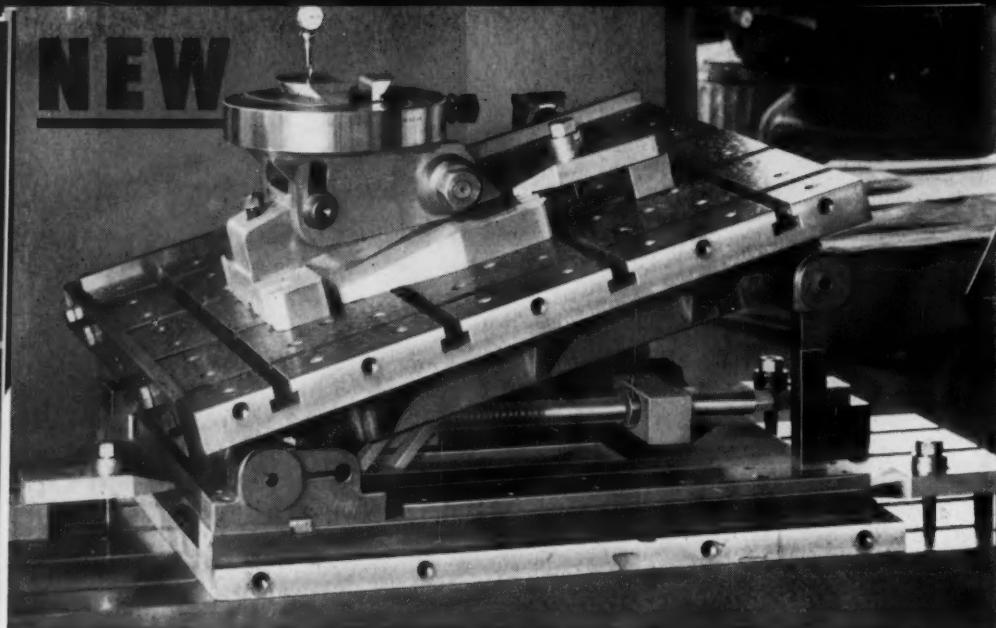
ENORMOUS CAPACITY of the Carlton 5A radial drill (10-ft. arm, 26" diameter column) allows you to drill all the holes in your large castings *at one setting*. This saving in reduced handling time is matched by precision accuracy — with Carlton you drill it right the first time.

You benefit in many other ways with Carlton radial drills: pushbutton control, super-precision column clamp, low-hung drive, positive tooth feed clutch and easy, economical maintenance. Check Carlton and you'll buy Carlton, the completely modern radial drill.

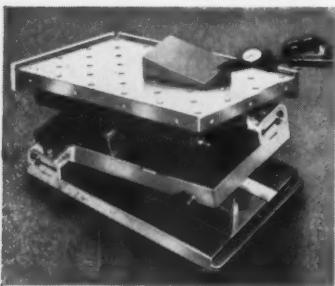
Arm lengths from 3-ft. to 12-ft., column diameters from 9" to 26". Send today for descriptive bulletin. The Carlton Machine Tool Co., Cincinnati 25, Ohio.

Carlton
radial and horizontal drills

NEW



Robbins **SINE PLATE**
WITH 24" x 24" WORKING AREA



Smaller Sine Plates are also available in models for both single and compound angles. Thousands are in daily use. Full details are in our illustrated catalog. Send for your free copy.

Designed on the sine bar principle, this husky new addition to the Robbins Sine Plate family provides gauge-block accuracy to angular set ups for very large, bulky work pieces. Any angle is quickly and accurately set up by inserting the correct standard gauge blocks between the top plate and the base of the unit.

In addition to the sturdy construction of these units, and to eliminate any possibility of dimensional inaccuracies due to distortion, gauge blocks are inserted at each side of the Sine Plate. Top plate is raised and lowered by a simple screw-type mechanism . . . positioning is simple, safe, sure.

Two of these Sine Plates used in combination also answer the need for any compound angle.

Complete information on these new extra-large Sine Plates or models built to specifications will gladly be forwarded upon your request.

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Metal Forming and Drawing Dies
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Die Casting Dies • Metal Patterns
Cams • Prototype Work
Production Milling
And Many Other Jobs

faster and more
economically

with



Type BG-21

KELLER MACHINES

CAPACITIES: from 4 FEET X
2½ FEET to
10 FEET X
4 FEET

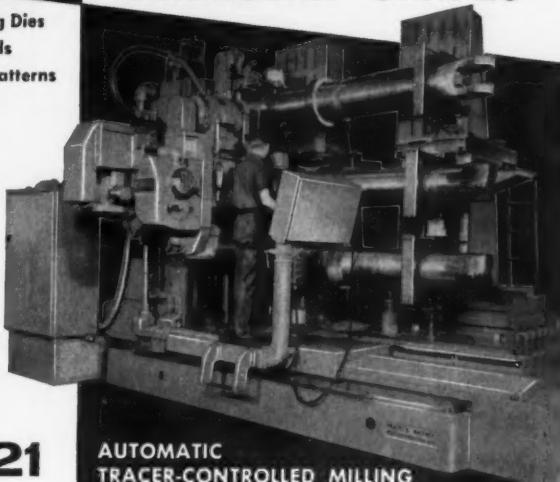
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CHICAGO, ILL.
SEPT. 19TH-21ST,
INTERNATIONAL AMPHITHEATER



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POSITION _____

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...only the MARVEL is Universal



Only on a No. 8 MARVEL can the saw column be instantly indexed and locked at any angle from 45° right to 45° left, and the saw then fed thru the work at the desired angle — without moving the work.



Only a No. 8 MARVEL can do all of these things: Snip-off a $\frac{3}{8}$ " red or cut-off an 18" x 18" cross section.



Rough to Size and Shape



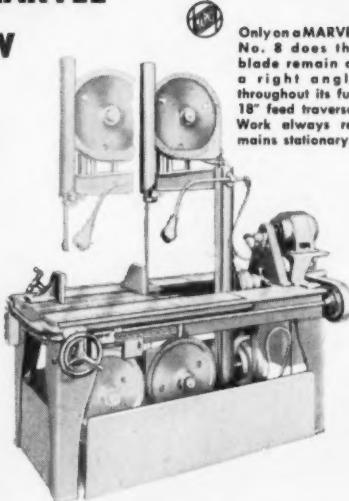
Mills



Index



Cut off and shape
Structural Beams



Only a No. 8 MARVEL has the large T-slotted work table, with removable quick action vise, that permits accurate set-ups of work of unrestricted sizes and shapes, special fixtures; Etc.

"Rough Machine" to size and shape with minimum chip waste

The No. 8 MARVEL is the "busiest tool in the shop" wherever installed because it is a *universal* tool—has both the capacity and the versatility to handle not only standard sawing jobs but innumerable "trick" and convenience jobs as well. More than a metal saw, the No. 8 MARVEL is a fine machine tool with machine tool features like: Both power and hand feeds; Depth Stops; Automatic Blade Tension; Built-in Coolant Pump; Three operating speeds (or six with 2-speed motor). Moisture-proof electrical controls that conform to both "J.I.C." and "MACHINE TOOL" electrical standards; Dirt-proof ball bearings, etc.

If you cut, machine or fabricate metal, this is a sawing machine you should know about. Write for catalog.

MARVEL Metal Cutting
SAWS.
Better Machines—Better Blades

ARMSTRONG-BLUM MFG. CO. • 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.

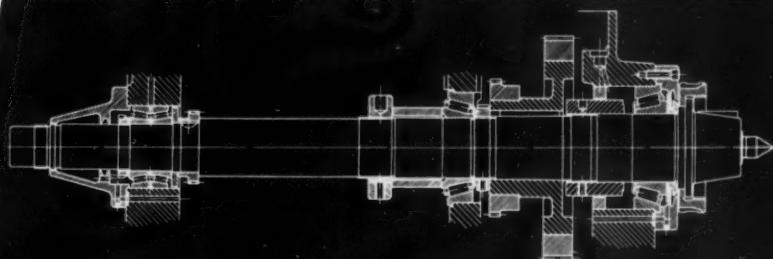
FOR A BETTER DRIVE

... **Lodge & Shipley** puts it

"ON THE NOSE"



... Locating drive gears and main bearings near spindle nose, drive gears rigidly keyed to spindle for maximum strength — power — accuracy.

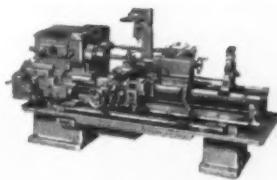


Spindle, Drive Gears and Bearings on 14" and 16" Heavy Duty and 20" Standard Lathes.

Location of driving force and bearings close to the load is a proven advantage in power transmission. Lodge & Shipley drive gears and main bearings are literally "on the nose," grouped at the forward end of the spindle just inside the headstock.

Giving extra ruggedness and power, this detail is an example of the design skill that goes into every part of the Lodge & Shipley Lathe. The result, proved by thousands of users, is a lathe that gives more in production and accuracy—costs less in operation.

For your next lathe, consider a Lodge & Shipley. A representative will welcome the chance to compare a Lodge & Shipley . . . point by point . . . with any other lathe. Request Bulletin No. 200 which describes and explains the many features. The Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.



Lodge & Shipley
....your **LODGE-ical choice!**

Tough grinding jobs?

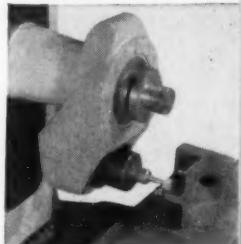
Check **Vulcanaire**
high speed precision
grinding heads!



Grinding circular slot using Vulcan's Rotary Table and Magnetic chuck.



Vertical adaptor for Surface Grinders. Grinding small slots



Horizontal application Grinding a Shoulder Punch.

Major Vulcan Services

Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

VULCAN TOOL CO.

*

720 LORAIN, DAYTON, OHIO



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SIMONDS "RED TANG"

FILES

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For Fast Service
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Complete Stocks
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FASTER
circular precision grinding!

Now with this table and with less effort you assure highest standards of accuracy, flatness, finish and close tolerances. At the same time you eliminate slow and complicated tool setups. You cut grinding time greatly by using only cross feed while the table is rotating at infinite speeds between 40 and 100 RPM.



Work clamped to motorized table, mounted on sine plate. Surface grinder application.

For example, Vulcan's Rotary Table can be used in connection with a sine plate or angle fixture. The dressing of large expensive external wheels for side grinding is therefore eliminated. If you wish we can provide permanent magnetic chucks designed for use with our table, both 6" and 10" in diameter.

Vulcan's Rotary Table is an air operated, self contained unit, portable between bench or machine. A precision center hole for locating and tapped holes in the table for clamping provides easy setup. Circular surface grinder applications are many and varied — grind flanged studs or bushings — bearing spacers — forming rolls — cutters — convex or concave surfaces — punches or dies (radius or angle).

Lapping? Yes — and in micro inches. For the 6" and 10" table, lapping plates of 12" and 16" are provided. Perfect for lapping valve plates, gages, bearing spacers and for carbide lapping using diamond powder. *Write for circular.*

Major Vulcan Services

Engineering . . . Processing . . . Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

VULCAN TOOL CO.

710 LORAIN

DAYTON, OHIO

Attain —

Real TOOLROOM Efficiency

with OLIVER DIE MAKING MACHINES



Speedy, efficient and accurate are OLIVER DIE MAKING MACHINES . . . proved in more than 10,000 installations throughout the world. They are consistently effecting cost reductions of as much as 60% by simplifying sawing, filing and lapping operations. Because they save time and do not require expensive skilled labor, OLIVERS have been in constant use in many plants for more than 25 years.

Engineered, designed and built by OLIVER of Adrian these die makers have proved themselves unsurpassed for accuracy. Proved invaluable on Production Filing,

Experimental Work, Metal Patterns, Cams, Gages and Templates, OLIVERS have been serving industry for almost 40 years. Cut down your die making costs . . . increase your output . . . saw, file and lap with OLIVER DIE MAKING MACHINES.



Oliver Die Makers available in 5 models —

The Bench Model 5-1 (illustrated) is a single speed die maker for use on tool steel up to 1" thick.

The Heavy Duty Model (illustrated) has 6 speeds, works in metal up to 3" thick, has variable strokes to 5" with hydraulic feed.

Write Today For Complete Technical Data on
OLIVER DIE MAKERS

See our catalog in Sweet's Directory

OLIVER INSTRUMENT CO.

1430 E. MAUMEE • ADRIAN, MICHIGAN

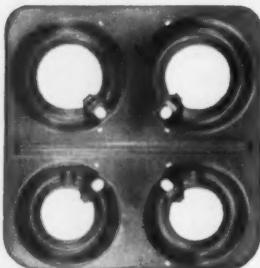
MACHINE TOOLS

by OLIVER include:

AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS
DRILL POINT THINNERS
TEMPLATE TOOL GRINDERS
FACE MILL GRINDERS
DIE MAKING MACHINES



Plastic Low Cost Tooling For Dies... Drill, Welding, and Assembly Jigs



Vulcan, keeping pace with modern tooling, can recommend plastic tooling for medium production on numerous tool programs.

Plastic tools are light in weight, have good impact, compressive strength and dimensional stability. No hand finishing of parts required as galling or marking is eliminated by using plastic form dies.

Contours and odd shapes are cast or laminated to suit individual tools, saving expensive machine and hand finishing operations.

Plastic tools, built in a matter of days instead of weeks, lower your tool costs for those medium production runs.

Our actual production figures prove plastic has a definite place in modern production.

Vulcan Tool Company's organization, building fine tools since 1916, believes new tooling developments must be proved by tool engineers. Since plastic is not a cure-all your problem should be handled by recognized, practical tool men.

Our engineering staff will recommend the correct plastic material and advise if parts of your tooling program should be in plastic.

Send a part print and your production requirements for quotation and recommendations.

Major Vulcan Services . . . Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

VULCAN TOOL CO....PLASTIC TOOL DIVISION

727 LORAIN

DAYTON, OHIO



as a semi-finished part

For many end product uses B&W Mechanical Tubing—carbon, alloy or stainless—is already semi-finished. Finish machining is often the only manufacturing step involved.

The simplicity with which B&W Mechanical Tubing is integrated into many different manufactured products is evident because B&W tubing is produced with the particular end use application in mind. Users of B&W Mechanical Tubing therefore benefit from reduced handling costs, machining time and scrap loss.

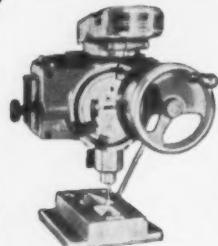
These and other advantages combine to effect overall savings in time, men, money and machines. For help in making a better product more economically, write for Bulletin TB-340, "A Guide to the Use of Seamless Mechanical Tubing," and Bulletin TB-361, "Design Economically with Mechanical Tubing." Or get in touch with Mr. Tubes—your link to B&W—who represents your local B&W tubing distributor, B&W's district sales offices across the nation, and the B&W headquarters technical staff. He can help you match tubes to jobs to save you time and money.

THE BABCOCK & WILCOX COMPANY TUBULAR PRODUCTS DIVISION

Beaver Falls, Pa., Milwaukee, Wisc.: Seamless Tubing,
Welded Stainless Steel Tubing
Alliance, Ohio: Welded Carbon Steel Tubing

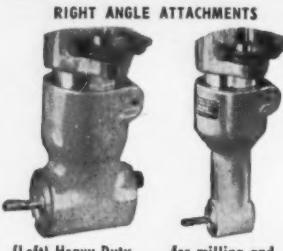
TA-4079(M)



**CHERRYING ATTACHMENT**

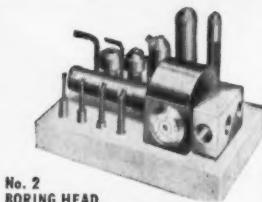
Makes possible production of convex and concave shapes. Ideal for producing drop forge dies, molds, cavities, metal core boxes, etc.

A few of
the Attachments
available



(Left) Heavy Duty . . . for milling and drilling at right angles; fits both Master and 1 HP Bridgeport Heads. (Right) Light Duty . . . for right angle milling and drilling narrow, deep molds and cavities.

Improved and providing great gripping power, with large diameter screw for rigid holding. Streamlined for appearance and equipped with coolant trough. Two sizes.

**No. 2****BORING HEAD**

Boring Tools and Holder provide means for boring holes up to 6" diameter; available for use on Bridgeport 1 HP Milling, Drilling and Boring Attachment.



MILLING
MACHINE
← VISE

Bridgeport

TURRET MILLING MACHINE'S ATTACHMENTS

add unprecedented versatility
in productive ability



Ask your dealer . . . or us . . .
to show how you, too, can
apply Bridgeport Attachments
to extend the utility
of your machines. Ask also
for literature on Bridgeport
Turret Milling Machines.

"Bridgeport Millers" in themselves, are universally recognized as machines of outstanding utility. Their exclusive method of being able to drill, mill, bore and shape over a wide area without changing set-up, has contributed much to their universal acceptance through the convenience, economy and accuracy offered. But this is not the whole story . . .

Note the attachments shown above. Here are a few means developed by "Bridgeport" engineers to go still further in extending the versatility of these machines . . . attachments which mean not only greater convenience but which vastly extend the operations which can be performed . . . attachments which will enable one machine to do the work of several single purpose machines. Furthermore, many more jobs can be assigned to the "Bridgeport" with the result that many more productive hours are available from one machine.

Bridgeport MACHINES, INC.

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

In Defense or Peace

ECLIPSE *Specials*
.... ARE THE BEST BUY!



Eclipse Radial
Drive High Speed
Steel Cutter bores
5 diameters in
steel part.



Special Cutter forms
ball seat in road build-
ing machinery unit.



Tungsten Carbide Tipped
Cutter precision bores three
diameters in aluminum
gear case.



Radial Drive
Tungsten Carbide
Tipped Cutter
bores gear pocket
in oil pump.

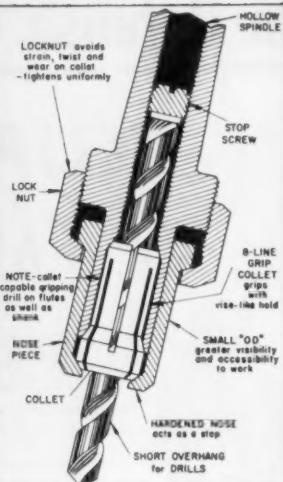
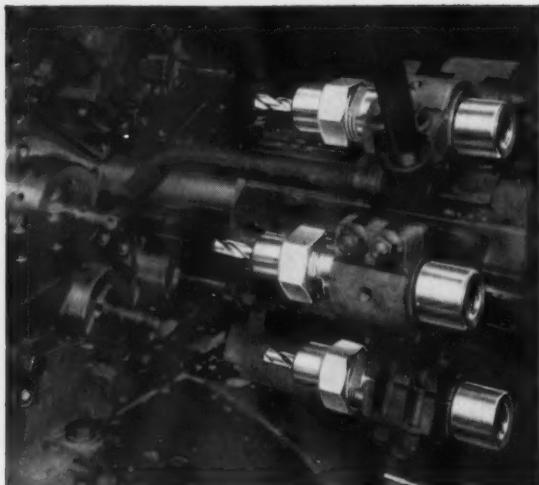


Multi-diameter cut-
ter with Tungsten
Carbide Tipped in-
serted blades for
boring, counterbor-
ing and chamfering.

Since 1913—through two wars and during the peace years—Eclipse has met the exacting and changing demands of industry for special purpose end cutting tools. What better test? What better recommendation? Our large modern plant can serve you, too. Send your problem to us, today!

ECLIPSE COUNTERBORE CO.
Founded in 1913

DETROIT 20, MICHIGAN



Precision or Quantity Runs Cost Less when you use Erickson chucks!

After all, these precisely machined chucks are scientifically designed to extend machine accuracy right down to the very end of the tool. No other chuck can guarantee equal accuracy. With Erickson accuracy you frequently reduce the number of operations.

Guaranteed accuracy of ".0005" and superior gripping power of Erickson collet chucks assure proper drill alignment. Drills then cut evenly on both cutting lips permitting faster machine feeds and proper speeds... give more holes per grind.

Production run records prove that Erickson chucks repay your investment in less than a month, often in the first week of operation. That's why we can confidently state that **Erickson chucks actually cost you far less!**



ERICKSON TOOL COMPANY

2304-F Hamilton Avenue • Cleveland 14, Ohio

COLLET CHUCKS • FLOATING HOLDERS • TAP CHUCKS • TAP HOLDERS • AIR-OPERATED CHUCKS
EXPANDING MANDRELS • SPECIAL HOLDING FIXTURES

Here's why!

1. More holes per grind.
2. Guaranteed accuracy of ".0005".
3. Collet collapses over a range of $1\frac{1}{2}$ " replacing seven standard single purpose collets.
4. Grips drills on flutes permitting stubbing and use of broken drills.
5. Permits greater feeds and speeds.
6. Gives better tool performance and extends tool life.
7. Reduces set-up time.
8. Tighter grip with even pressure along entire length of collet.

REDUCED TOOL COST, FASTER OPERATION

and GREATER ACCURACY

mean lower production costs for you. Send for your copy of our new Catalog K today! You'll find many interesting applications for all Erickson holding tools. Let an Erickson field engineer show you actual case histories.

A-10-58





MEASURE YOU UP FOR A HYDRAULIC PRESS?

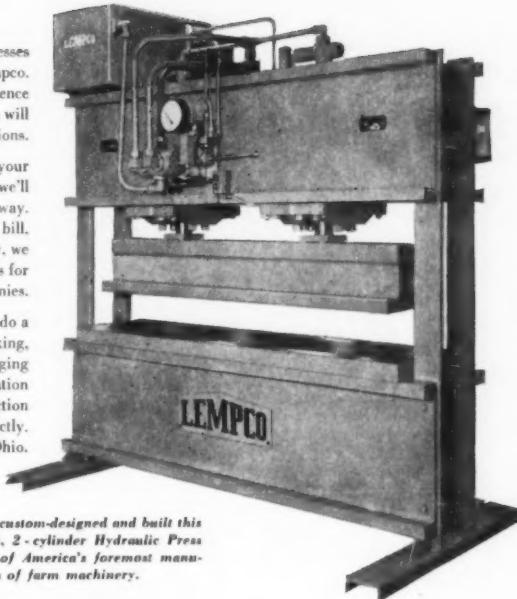
"Custom tailoring" Hydraulic Presses to do a particular job is our specialty at Lempco. And our 35 years of press-building experience is your guarantee that the press will measure up to expectations.

Lempco will tailor-make a Press to your specifications. Just tell us your needs and we'll get our Engineering Department on it right away.

Of course, if a standard Press will fill the bill, we have a full line of those too. Incidentally, we have designed and built Hydraulic Presses for many of America's largest companies.

So if you need a special Press to do a special job — straightening, bending, blanking, forming, deep-drawing, hot or cold forging or any other Hydraulic Press operation — drop us a line. We promise you fast action and a Press that will fill your needs exactly.

Lempco Products Inc., Bedford, Ohio.



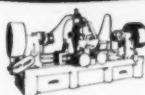
Lempco custom-designed and built this 300-ton, 2-cylinder Hydraulic Press for one of America's foremost manufacturers of farm machinery.

BEDFORD

LEMPCO

OHIO, U.S.A.

For 35 Years - a Leading Builder of Machine Tools



1897

**Finest Quality
in Design
Engineering and
Construction**



1955

**Fifty-Eight
Years of
Pioneering
and Progress**

MAKE 1955 A BETTER YEAR IN PRODUCTION OR MAINTENANCE

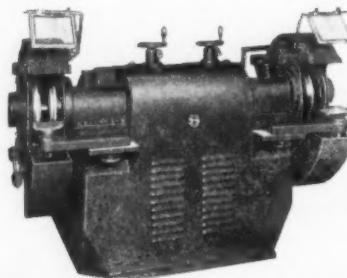
"**Y**OU can't do a good job without good tools" . . . since 1897 we've been supplying the best electrical tools for all industry . . . and today thousands of plants testify to the soundness of that statement. . . . So, make sure your electrical tools are right . . . and up-to-date.

**Check Your Tool Inventory
Bring Your Needs Up To Date**

**Contact Your Distributor
for these**

UNITED STATES ELECTRICAL TOOLS

Portable Electrical Drills
Bench and Floor Buffers
Bench and Floor Grinders
Valve Seat Grinders
Portable Grinders
Portable Surfacers
Portable Polishers
Portable Sanders
Portable Tappers
Bench and Floor Polishers
and other items.

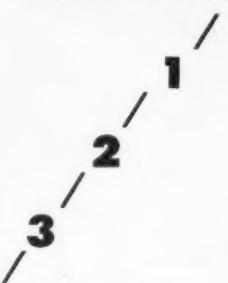


**DUAL MOTOR VARI-SPEED SNAGGING
GRINDER—Model 62 VS**

For vitrified or high speed wheels
Constant peripheral speed for each wheel
results in increased production and longer
wheel life. Wheel guards are adjustable to
wheel wear; interlocked with speed changer,
to prevent over-speeding of grinding wheels.
Totally enclosed fan-cooled, ball bearing
motors.

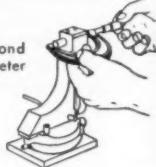
The **UNITED STATES ELECTRICAL TOOL Co.**
CINCINNATI, OHIO

EASY AS---



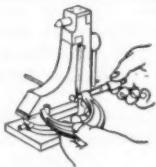
Measure over diamond point to back of micrometer plate.

①



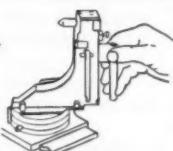
Add required convex radius or Subtract required concave radius.

②



Tighten gib. Dresser ready for action.

③



YOU CAN DRESS WHEELS UP TO 24" IN DIAMETER WITH J & S "FLUIDMOTION" WHEEL DRESSERS. MODEL REC SHOWN HERE.

The J & S "Fluidmotion" Wheel Dresser

The J & S "Fluidmotion" Wheel Dresser can be set in seconds to dress any angle. Complex concavities or convex shapes can be set in a few minutes.

Fully adjustable with swivel base and patented "Fluidmotion", there is no other method that gives you the "precision flexibility" and ease of dressing simple or complicated shapes and contours.

Write for fully illustrated literature that shows in detail the wide adaptability of the "Fluidmotion" Dresser for just about any wheel dressing job. It comes in several sizes that will dress wheels ranging from the smallest up to 24-inch diameter.

The only "radius tangent to angle" dresser.



WHEEL DRESSERS • JAW CLAMPS • PRECISION VISES • SINE BARS • DOWN-HOLDING DEVICES

REPRESENTATIVES IN PRINCIPAL CITIES

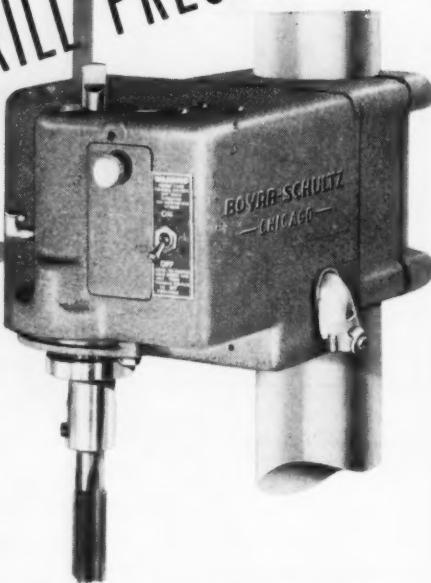
J & S TOOL CO., INC.

645 WEST MT. PLEASANT AVENUE

• LIVINGSTON, NEW JERSEY

YOU GET MORE
FROM YOUR DRILL PRESS
with

**Boyar-Schultz
LEAD SCREW
TAPPING
ATTACHMENT**



**Change Your Ordinary
Drill Press to a Precision**

Tapping Instrument in Minutes — Quickly and easily fitted to your drill press, it makes an efficient Tapping Attachment that can produce any thread including Class 4.

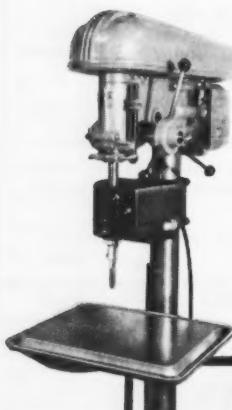
No special skill required for operation. Anyone familiar with a drill press can consistently produce accurate threads.

Foot control switch leaves hands free for loading work. Built in reversing switch actuates drill press motor, eliminating need for any intermediate reversing device.

Long, trouble-free life of bronze nut and ground thread Lead Screw is assured, because of their generous $1\frac{3}{4}$ " diameters.

Extreme accuracy in control of tapped hole depth is assured by electrically controlled reversing switches.

All taps up to $\frac{7}{8}$ " diameter usable with standard adapter bushings. Adapters for taps $15/16$ " to 2" available on special order.



BOYAR-SCHULTZ CORPORATION

2020 South 25th Ave., Dept. A-T, Broadview, Ill.

Announcing... *the* NEW Kearney & Trecker

**3 hp No. 2
7½ hp No. 3 Model CE**

plain and universal milling machines

Designed specifically
for EFFICIENCY,
EASE and ECONOMY
of operation

Here's Kearney & Trecker's answer to industry's need for a new milling machine that combines quality with low initial cost. The new Model CE's give you the three most wanted features — Efficiency, Ease and Economy of operation. What's more, these machines can be obtained under Tool-Lease.

The economical Model CE's are available in either No. 2 (3hp) or No. 3 (7½hp) size — both in plain and universal styles. The CE's feature 16 quick-change speeds (25 to 1300 rpm) and feeds (½ to 25 ipm). They are ideally suited for a wide variety of applications—especially for small tool shops, repair and maintenance shops and vocational training schools.

For the full story, contact your nearest Kearney & Trecker representative.



7½ hp No. 3
Model CE Plain

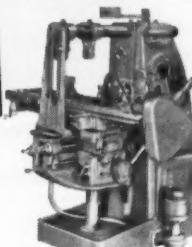
3hp No. 2 Model CE Universal

NOTE: Standard equipment includes choice of only one arbor support. Overarm brace available at additional cost.

available for
TOOL LEASE



Ask for Model CE catalog, CE-10 and Tool-Lease bulletin, TL-10A. See our catalog In Sweet's.



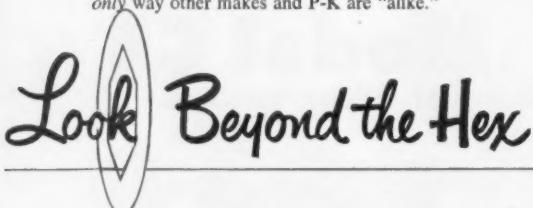
NOTE: Choice of one arbor support. Only Conventional Lead Attachment is available in Universal machines. Overarm brace at additional cost.

Kearney & Trecker Corp.

MILWAUKEE 14, WISCONSIN

How do you buy Socket Screws?

Do you specify some one make by *habit*, because you think *all* such fasteners are alike — all simply "screws with hex sockets?" If you do, and have never used P-K Socket Screws, break the habit *once* and give them a trial. You'll find that the hex shaped socket is about the only way other makes and P-K are "alike."



It pays to look beyond the socket when you buy Socket Screws. Compare every detail of product and service, and you'll find P-K Socket Screws take top honors in every test for quality, performance, economy.

Why miss out on any of the advantages you can get with P-K Socket Screws? Try them. For samples, catalog, or any needed information, see your P-K Distributor, or write: Parker-Kalon Division, General American Transportation Corporation, 200 Varick St., New York 14.



→ FOR ADVANCED DESIGN
that speeds assemblies — makes them
simpler, stronger — and saves errors.



→ FOR TOP QUALITY and
tolerance gaged to your most exacting
specifications — and guaranteed.

→ FOR ASSEMBLY STRENGTH
okayed in a million punishing tests by
thousands of satisfied users.

→ FOR PLANNING AIDS and
buying data patterned to your special
needs, plus advice on assembly.

→ FOR SUPPLY SERVICE set
up for fast action and lower purchasing
expense — by local Distributors.

GET ALL
THESE ESSENTIALS OF
COST-WISE ASSEMBLY

PARKER-KALON SOCKET SCREWS



In Stock for immediate delivery — see your nearby P-K Distributor



DON'T BE A SHEEP WHEN BUYING GAGES!

You can go far astray following a "FAD"

It's fashionable today to buy costly, complicated gages for even simple gaging requirements. Sure, we like to sell expensive gages, but we don't think it's good business to sell such gages when simple gages will do. Perhaps an Indicator Gage does require a little operator care but it's still the most economical when a few instructions are given on its proper care and use. And after all, its accuracy is entirely adequate for most applications.

Consider a few of the advantages of using Indicator Gages where these will perform the job: Each gage is a complete package — there are no extra appurtenances to buy and maintain. No wires and hoses to drag and tangle. No accessories to lose, no airlines to keep clean. It is simple to operate, simple to maintain. Its purchase price is low, as is also its maintenance cost. In addition, the greater range per unit, and its greater flexibility, permit an Indicator Gage to perform far more operations than an excessively accurate and complicated gage so fashionable right now.

Ask for our complete catalog.

Federal Products Corporation
5142 Eddy Street, Providence 1, R. I.



Ask **FEDERAL**
FOR ANYTHING IN MODERN GAGES...

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automatically Controlling Dimensions on Machines

a practical approach
to pressroom modernization

TWO NEW PLANS

to solve press obsolescence
problems

The extensive capital expenditures required to meet competitive pressures have put many manufacturers in an unfortunate position. Modernization is necessary if the manufacturer is to price his product competitively and still make a fair profit. However, the fair profit is necessary before he can afford the modernization. Two new Verson plans make it possible to modernize now and pay for it out of the increased profits it provides. If you are one of the manufacturers faced with the dilemma of needing modernization for better profits, but needing better profits before you can afford modernization, one of these plans may be the answer to your problems.

Customized

INSTALLMENT PROGRAM

For the manufacturer who wishes to own his own presses but minimize his initial capital outlay, Verson offers a Customized Installment Program. It is called "Customized" because the payment plan is tailored to the buyer's own financial requirements rather than to a single fixed plan. Initial payments may be as low as 10 per cent of the purchase price with the balance payable over periods ranging from six months to five years. Further information on a plan to meet your needs will be furnished on request. Please outline your requirements.

A Verson Press for every job from 60 tons up.



ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION
VERSON ALLSTEEL PRESS CO.

9310 S. Kenwood Avenue, Chicago 19, Illinois
So. Lamar at Ledbetter Drive, Dallas, Texas

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES
TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

Customized

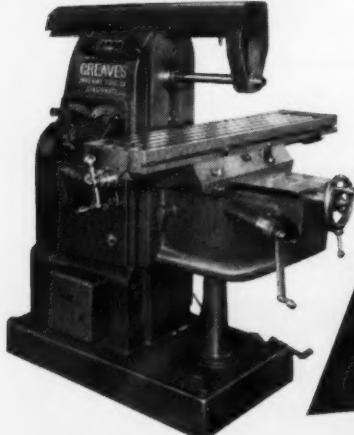
LEASING PROGRAM

For the manufacturer who wants the advantages of modern, efficient presses without capital investment, Verson offers a Customized Leasing Program. Like the Installment Program, a choice of plans is available to best suit the buyer's requirements. In addition to the basic plans, options for continuation, termination and eventual purchase are also available. Special arrangements for special machines will be considered. Further information on a leasing plan to suit your needs will be furnished on request. Please outline your requirements.

For multiple milling operations a battery of low-cost GREAVES MILLS



**multiple mills
speed production,
save set-up time!**



When you get 5 milling machines for the usual price of 2 or 3 . . . set up "production line milling" that's easily adapted to an extremely wide range of parts . . . you also get important savings! So reports an aircraft parts plant that installed 5 GREAVES MILLS, saved capital investment, production and set-up time!

With extra-size tables, 60" x 12" having 34" travel, GREAVES MILLS can be set up for fast, precise machining of larger parts requiring longer travel. Attachments include: dividing heads, vertical and universal milling, rack cutting, slotting, rotary table and others.

Write for Price and Performance Comparison Chart

GREAVES MACHINE TOOL CO.

2700 EASTERN AVE., CINCINNATI 2, OHIO

THINKING OF SHAPES?



Prices start
as low as
\$1575.00

(Motor and all
Electrical Equip-
ment Included)

Pedrick Production Benders are not only very satisfactory for bending pipes, tubes, etc., but may also be used to bend two structural angles simultaneously, as is shown in the picture. By merely changing the dies, most any bendable material can be bent in production quantities. Measured in pipe capacities, eight production benders are available up to and including 6-inch extra heavy pipe.

WRITE FOR DESCRIPTIVE FOLDER, DEPT. 5

PEDRICK TOOL & MACHINE CO.

3640 N. LAWRENCE ST., PHILADELPHIA 40, PA., U.S.A.

B-RIGHT-ON®

SOCKET SCREW PRODUCTS

always measure up!



Socket screw users who want
what they want where they want it know
it pays to specify B-RIGHT-ON! Brighton
Socket Screw Products *always measure up*.

Standard or special, Brighton Screws must meet
and pass factory standards that are higher even than
those specified by the ultimate user of the screws. Rigid
control, from initial steel selection to final pack-
aging, certifies every screw as B-RIGHT-ON quality.
Selected mill supply houses, Brighton distributors,
complete the control chain, assure the user of
service and delivery as dependable as
the screws . . . B-RIGHT-ON service.
Write for descriptive literature...see how

**YOU CAN DO BETTER
WITH B-RIGHT-ON.**

**THE BRIGHTON SCREW
& MANUFACTURING CO.**
READING RD. AT DORCHESTER
CINCINNATI 2, OHIO





years of precision toolmaking

75

industry and to millions of skilled craftsmen by Laroy S. Starrett and the company which he founded.

On the occasion of our 75th Anniversary Year, the many distributors who make STARRETT products available to you through a convenient and reliable source of supply join us in our pledge to continue and increase the STARRETT reputation for quality and service.

Starrett®

"WORLD'S GREATEST TOOLMAKERS"

TOOLS AND PRECISION INSTRUMENTS • DIAL INDICATORS • STEEL TAPES
PRECISION GROUND FLAT STOCK • HACKSAWS, BAND SAWS and BAND KNIVES
THE L. S. STARRETT COMPANY, ATHOL, MASSACHUSETTS, U. S. A.





from interchangeable parts...

Danly Die Set Service is Faster!



Choose the Danly Branch closest to you—

BUFFALO 7	1807 Elmwood Avenue
CHICAGO 50	2100 S. Laramie Avenue
CLEVELAND 14	1550 East 33rd Street
DAYTON 7	3195 Delchos Avenue
Detroit 16	1549 Temple Avenue
GRAND RAPIDS	113 Michigan Street, N.W.
INDIANAPOLIS 4	5 West 10th Street
LONG ISLAND CITY 1	47-28 37th Street
LOS ANGELES 54	Ducommun Metals & Supply Co., 4890 South Alameda
MILWAUKEE 2	111 E. Wisconsin Avenue
PHILADELPHIA 40	511 W. Courtland Street
ROCHESTER 6	13 Rutter Street
ST. LOUIS 8	3749 Washington Blvd.
SYRACUSE 4	2005 West Genesee Street

One of the main reasons for Danly's faster die set service is the *interchangeability* of die set parts achieved by Danly. It starts at the main Danly Plant where die set components are produced to Danly's traditional high quality, precision standards. The faster service cycle continues at all of the Danly Branch Plants where thousands of *interchangeable* die set components are stocked. The cycle is completed at the Danly Branch in your area where these parts are assembled as a die set to meet your specific requirements and shipped as soon as your order is received. So remember—for the best in die sets in the shortest time, the place to call is your local Danly Branch.

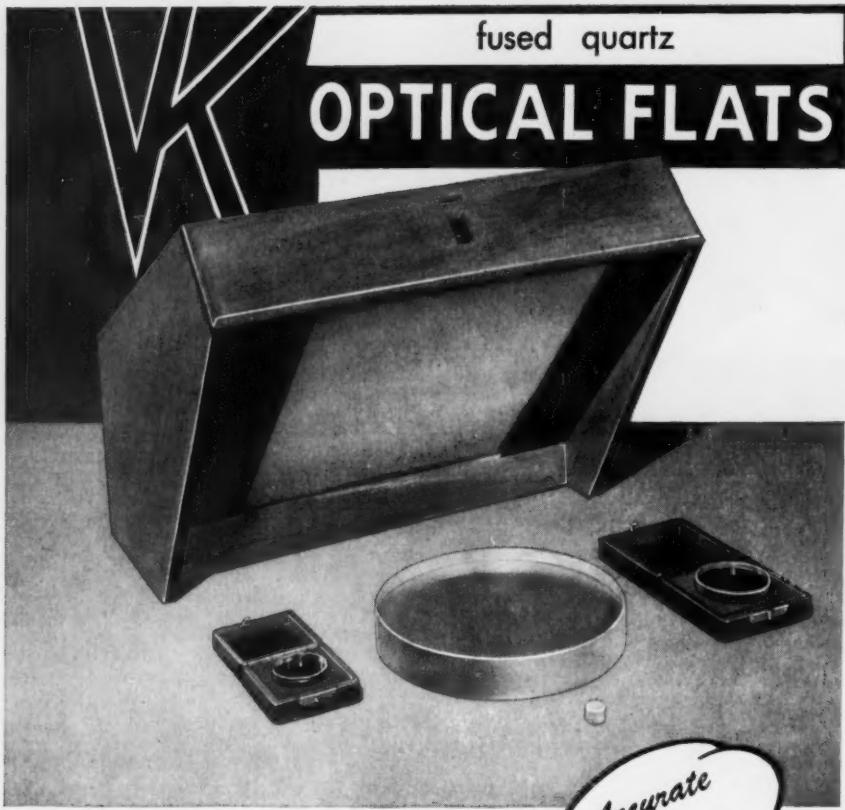


DIE SETS . . .
STANDARD OR SPECIAL
DIEMAKERS' SUPPLIES

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue
Chicago 50, Illinois



...to finished die sets



With VK Optical Flats, close checking of flat surfaces is simplified and more conveniently handled.

Shown here is the new Van Keuren monochromatic light, 22 $\frac{1}{4}$ " wide, 17 $\frac{1}{4}$ " high and 20" deep (in bench space). It is designed for use with large optical flats such as the one shown—a 10" diameter fused quartz double-surface master flat (accurate to .000001" both sides).

VK Optical Flats are available in sizes from $\frac{1}{2}$ " diameter to 10" diameter in .000001", .000002" or .000004" accuracy. They can be shipped within 30 days from order.

Catalog and Handbook No. 35 is available by writing: The Van Keuren Co., 175 Waltham St., Watertown, Mass. Ask for your copy.

36th YEAR

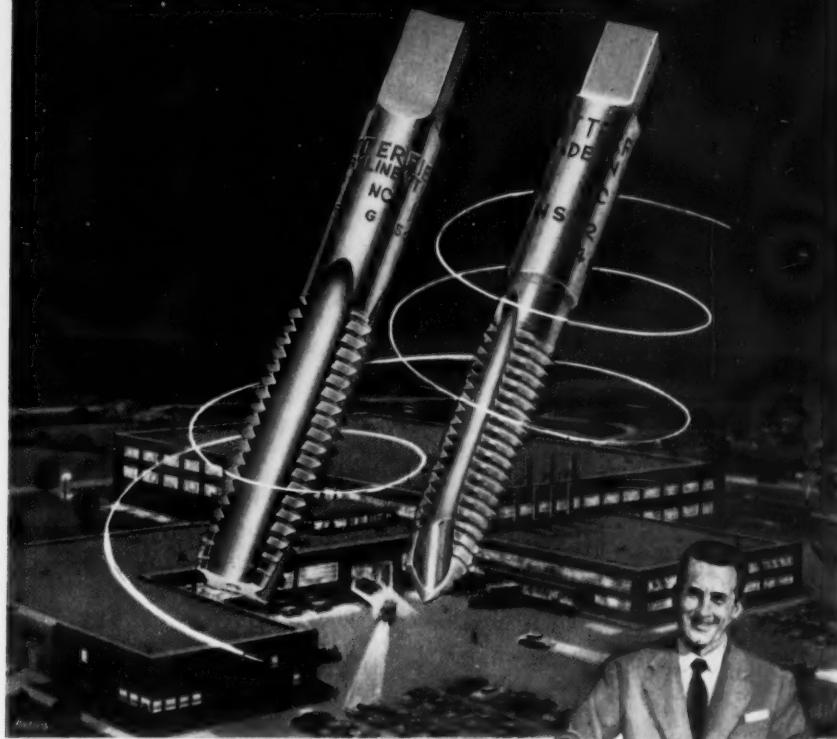
THE

Van Keuren co.

175 WALTHAM STREET, WATERTOWN, MASS.

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carbalyz Cemented Carbide Plug Gages • Carbalyz Cemented Carbide Measuring Wires

BUTTERFIELD



A COMPLETE LINE OF QUALITY cutting tools is now available from your Butterfield distributor. Taps are made to the same exacting standards as Butterfield Milling Cutters, Dies, Drills, Reamers, Counterbores and End mills.

UNION TWIST DRILL COMPANY
BUTTERFIELD DIVISION
DERBY, VERMONT, U.S.A.

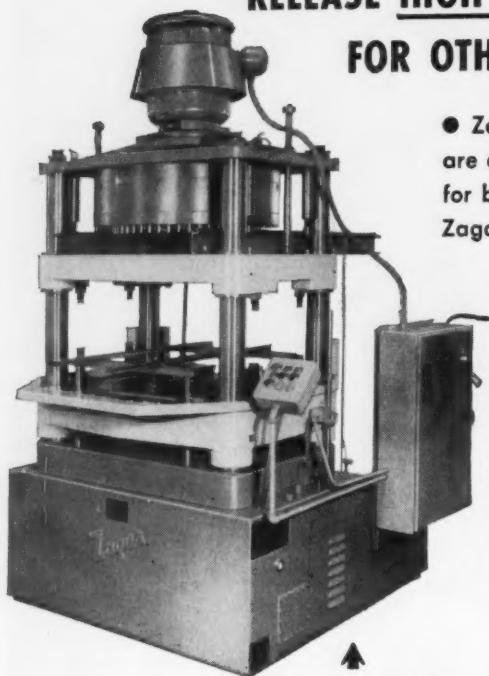
FOR FAST, ECONOMICAL SERVICE
CALL YOUR
BUTTERFIELD
DISTRIBUTOR



Zagar 4-POST RAM TYPE DRILLING MACHINES

RELEASE HIGH COST DRILL PRESSES

FOR OTHER IMPORTANT JOBS



- Zagar hydraulic drilling machines are designed for high speed drilling—for both production and limited runs. Zagar 4-post machines reduce high cost tooling, and handle a range of work that ordinarily necessitates the use of several different machines. Very important, Zagar drilling machines release capital equipment for other purposes. Zagar 4-post machines lower your capital investment. They quickly pay out. What, sir, are your production requirements?

Zagar hydraulic ram-type 4-post machine
drills 150 holes, $5/16''$ through $5/8''$ dia. in
aluminum casting at one pass.

Get Zagar's Engineering Manual
"S-2" for details on all sizes of
4-post drilling machines.

ZAGAR TOOL, INC.

24000 Lakeland Blvd., Cleveland 23, Ohio





PUTNAM END MILLS

Cut Time and Tool Costs

Time and Tool Costs are Cut by using Putnam End Mills. For, they are properly designed and carefully manufactured for free cutting action, longer life and ability to "stand-up" when operated at high speeds and heavy feeds.

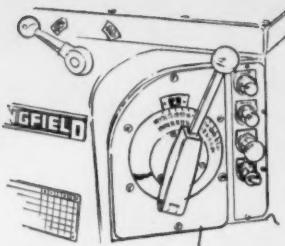
Proven Putnam End Mill superiority assures the ultimate in efficient milling of dies, tough-to-machine materials, non-ferrous metals, etc.

Give them a try on your rugged milling operations and watch them really "hog" in and remove stock.



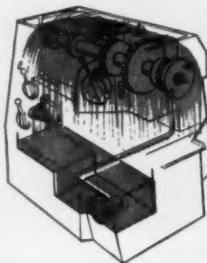
it does more work (and the operator does less)

Simple, least-effort controls: color-coded dial selection of 24 spindle speeds; four levers for totally enclosed gear box; tailstock wheel set at angle for easiest operation; wheel has two speeds, one for normal operation, one for drilling; chip pan on casters for quick movement to insure cleaner, safer floors.



it runs cooler

Continuous oil-mist lubrication of all headstock gears does more than lubricate; it carries heat away into large sump in headstock leg. Cooler head minimizes distortion during warmup; markedly improves accuracy and stability of work alignment.



it saves power, cuts wear

The headstock has only four gears in mesh at once for any speed. Other gears run free; flywheel action adds to stability. No "pass-through" gears in shifting.

it promotes cleanliness—and safety

Clean modern design encourages good shop practices, better maintenance; builds pride in workmanship and better quality in work produced.

Engine and toolroom lathes:

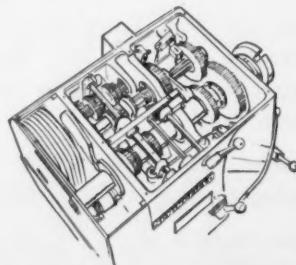
swings 14" to 32"

Contouring and reproducing lathes:

swings 14" to 32"

Universal vertical grinders:

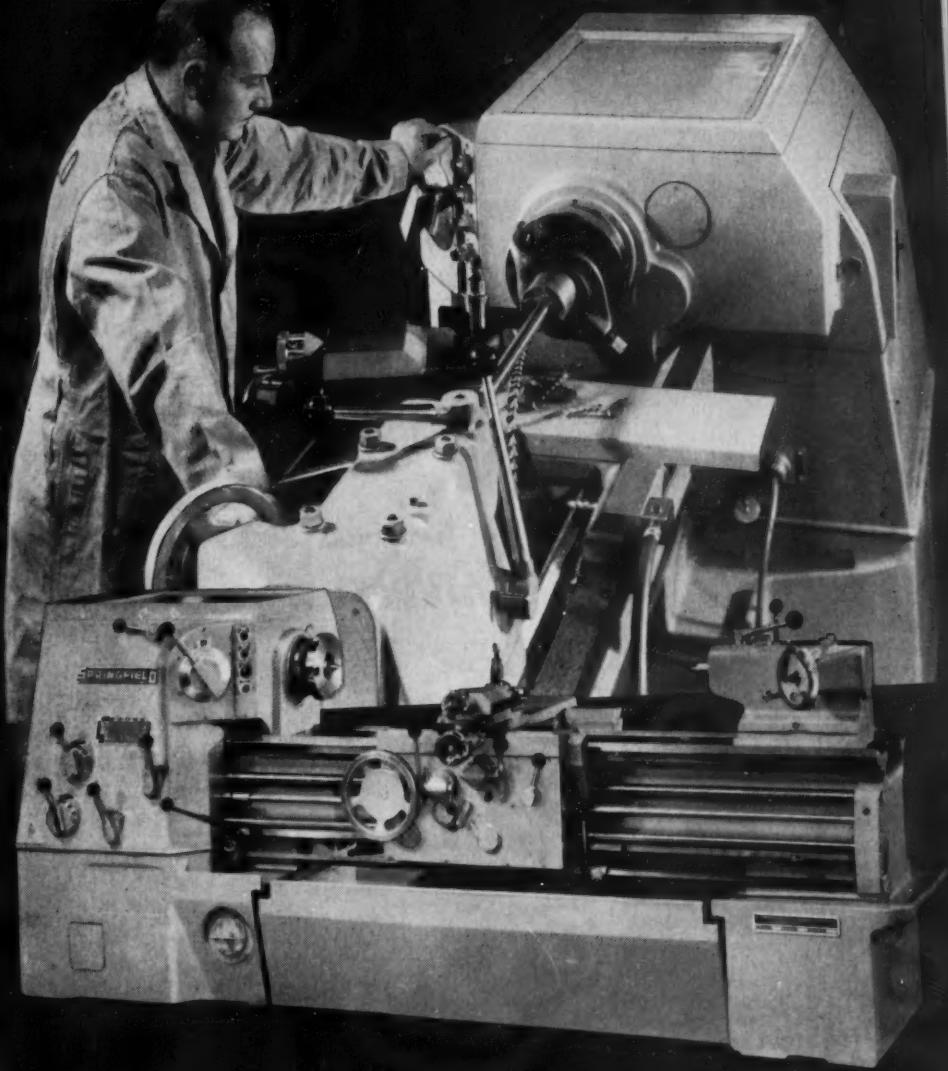
swings 21" to 52"



write for name of your nearest dealer

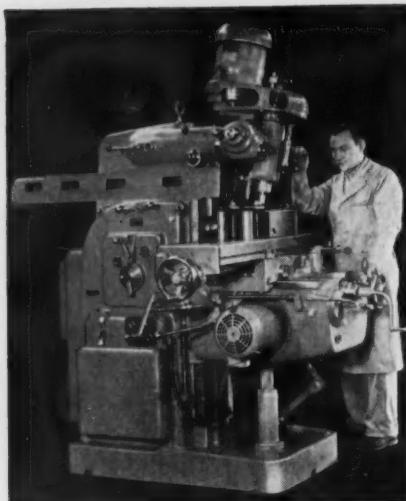
THE SPRINGFIELD MACHINE TOOL CO. • SPRINGFIELD, OHIO

because it's simple



*67th year of building
ideas into machine tools*

NEW GORTON DOUBLE-DUTY MILL PROVIDES SPECIFIC ADVANTAGES



VERTICAL-ANGULAR MILLING

• COMBINES RUGGED DESIGN,
TOP PERFORMANCE WITH
TOOL ROOM ACCURACY

• For horizontal milling and
vertical or angular milling
without re-locating work

As a horizontal it does conventional and climb milling up to 2,000 R.P.M. As a vertical-universal, it does precision work up to 5,600 R.P.M.

COMPARE THESE FEATURES

Exclusive Gorton Receptor Ram increases work area, vertical capacity and transverse cutting capacity.

Available with 56" table (28" travel), 62" table (34" travel) or 76" table (48" travel).

Interchangeable Assembly Unit Construction offers multiple advantages.

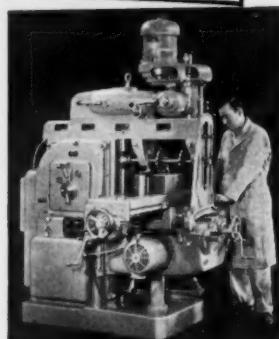
Horizontal spindle horsepower: 7½, 10 or 10 over 5. Super-speed belt-driven vertical spindle: 1½ over ¾ H. P.

Rigid support for work with 24½" bearing spread on knee and large square lock bearing guides.

Exclusive removable coolant pan speeds sump cleanout and coolant interchange.

Mechanical and dual electrical overload protection for cutters and work.

GEORGE GORTON MACHINE CO.
1702 RACINE STREET • RACINE, WISCONSIN



HORIZONTAL MILLING

Write for this Gorton General Catalog of milling machines, die and mold duplicators and pantographs. Ask for Bulletin 1655-1702. No obligation.



5

FURNACES IN ONE

the LINDBERG Carbonitriding Furnace

Yes, it's many furnaces in one! It's designed not only for carbonitriding . . . but also for hardening, carburizing and carbon restoration. It's self contained . . . it's easy to maintain!

10 reasons why Lindberg Carbonitriding Furnaces are better

1. Heating is by new type, gas-fired, vertical radiant tubes. They weigh only 29 pounds each . . . can be changed in two minutes.
2. Vertical radiant tubes last longer . . . often two or three times as long.
3. Quench tank is built-in . . . no costly excavation or piping necessary.
4. Quench tank has fin type oil cooler . . . maintains oil at proper temperature.
5. Specially designed chamber purges work before it enters heating chamber.
6. Special check-light system tells you where charge is at any given time.
7. Control of heating and quenching cycle is automatic.
8. Lindberg Carbonitriding Furnaces are made for automatic, semi-automatic, or manual charging.
9. Lindberg Carbonitriding Furnaces have been tested under three years of rough operating conditions.
10. Lindberg "Hyen" generators which supply atmosphere for Lindberg Carbonitriding Furnaces are instantly adjustable for many different types of atmospheres.

For full details,
ask for bulletin #241

LINDBERG  **FURNACES**

Lindberg Engineering Company • 2469 West Hubbard Street • Chicago 21, Illinois

Report from Plant #1

"This shop has been rolling
 $\frac{3}{8}$ "-16 threads continuously
for two months - at
2000 rpm. Still on
first set of rolls.
350,000 pieces to date."

Report from Plant #2

"Have three machines rolling
 $\frac{7}{16}$ "-20 threads on C-114 steel studs -
'Close to a million' so far - and
rolls have not been turned
around **"

*Taken from two recent
National Acme sales re-
ports. More information
on request.*

(*Thread Rolls are reversible, having a
lead of $1\frac{3}{4}$ to $1\frac{1}{4}$ threads on both sides.)

THESE thread rolling

PRODUCTION PICTURES

WOULD LOOK GOOD IN ANY SHOP

These two reports show that National Acme (Fette Patent) SELF-OPENING Thread Rolling Heads come mighty close to being the answer to a production engineer's prayer for a steady, day-in, day-out flow of threaded pieces into the pan.

And when you consider that these thread rolling heads give you *better threads*—with smoother, more wear resistant surfaces, and with no cratering at the

crest—aren't you missing a bet if you don't put them to the test on your threading jobs?

Wherever the work calls for threading machined parts from the end, there's no faster, better way than to "roll-em-on" with a National Acme (Fette) self opening head.

We'll be glad (and we think you will be too) if you ask us to prove that statement. Send sample or blue-print for our recommendation—or ask our representative to call.

May we send you a copy of Catalog FRH-53A?



National Acme (Fette) Thread Rolling Heads are used on automatics, turret or hand lathes, threading machines, drill presses—and other types of vertical or horizontal machines. Basically, they are SELF-OPENING heads which operate like a die head, except that threading rolls are used instead of chasers. And they OPERATE AT HIGH-SPEED-STEEL TURNING TOOL SPEEDS. Made in Revolving Type (capacities $7/16''$ to $1''$) and in Non-revolving Type (capacities $1/16''$ to $3/4''$).

**THE NATIONAL
ACME COMPANY**

103 EAST 131ST STREET • CLEVELAND 6, OHIO.

for

ACCURACY +
CAPACITY +
EFFICIENCY +
ECONOMY +

Performance proves
in every feature



SERIES "6300" HEAVY-DUTY 12" PRECISION
LATHE • 1" COLLET CAPACITY



MASSIVE BED

A rugged foundation for accurate work. Built-in screw-type leveling jacks.

CONDENSED SPECIFICATIONS

CAPACITY — Swing: 12 $\frac{3}{4}$ " over bed; 12 $\frac{1}{4}$ " over saddle wings; 7 $\frac{1}{2}$ " over saddle. 24" — 36" — 48" between centers.

BED — 7 $\frac{3}{8}$ " wide, 5 $\frac{1}{8}$ " deep. Two Vee, two flat ways and underside of bed are precision-ground.

THREAD RANGE — 48 selections, 4 to 224 Standard, right or left.

SPINDLE SPEEDS — Countershaft Drive, 8 (50-1300 R.P.M.)

Variable Speed Drive, Infinite (30-1400 R.P.M.)

POWER LONGITUDINAL FEEDS — From .0013" to .009" (left or right) per revolution of spindle.

TAILSTOCK — 1 $\frac{1}{4}$ " diam. ram, 3" travel. Ram graduated 0 to 3" by $\frac{1}{16}$ ths. No. 3 Morse Taper. 1" set-over.

the PLUS value of CLAUSING Lathes!

The exceptional performance of the CLAUSING 6300 Series Lathe on production, tool room, research or maintenance work is a direct result of its many built-in CLAUSING *Plus* values. The headstock is fully enclosed and all moving parts run in a pumped bath of oil. Spindle is forged, precision-ground steel with 1 3/8" bore and 1" collet capacity . . . turns on "Zero-Precision" Timken tapered roller bearings. Hardened and ground spindle nose, L-00, is tapered key-locked type. Dual A-belt drive with spindle pulley mounted outboard. Quick-change mechanism provides instant selection of 48 threads or feeds. Both quick-change mechanism and double-walled apron are enclosed and gears and shafts run in bath of oil. For accuracy, capacity, efficiency and economy, there's nothing like the CLAUSING 6300 at or near its price!



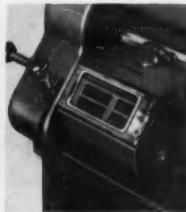
FULLY ENCLOSED HEADSTOCK

Spindle turns on widely-spaced "Zero-Precision" Timken tapered roller bearings with tolerance of .00015".



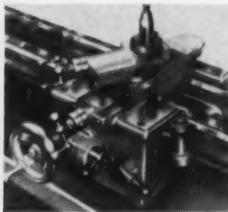
ENCLOSED OUTBOARD DRIVE

With dual-belt outboard drive, replacing belts is a quick, easy job — no need to disassemble headstock and spindle. Variable speed drive optional.



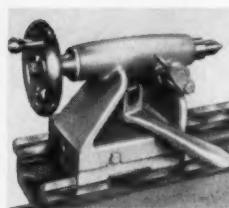
QUICK-CHANGE MECHANISM

Quick-change gear box
is fully enclosed. Has
oil bath lubrication, $\frac{1}{2}$ "
wide steel gears, ex-
clusive over-ride clutch.



DOUBLE-WALLED APRON

Thick-walled apron is fully enclosed. Has built-in safety lock oil bath lubrication.



HUSKY TAILSTOCK

Has No. 3 MT ram with tang socket . . . holds tools without slippage. Long key guide that absorbs heavy torque loads.



SPINDLE NOSE

Tapered key-locked type, hardened and ground. Spindle can be reversed or braked without danger of the chuck's coming off.

See YOUR NEAREST ATLAS CLAUSING DEALER OR Write FOR ILLUSTRATED CATALOG

CLAUSING DIVISION, QUALITY MACHINE TOOLS SINCE
Atlas Press Company

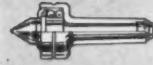
2-110 N. PITCHER ST., KALAMAZOO, MICHIGAN

CLAUSING HEAVY-DUTY MACHINE TOOLS • ATLAS METALWORKING MACHINE TOOLS • ATLAS WOODWORKING POWER TOOLS





Shank



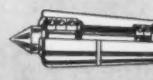
Ball & Roller



Pipe Type



Bull Nose



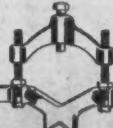
Built-in Spindle



High Speed



Carbide Tipped

Reversible
Grinder DogsCam Action
Grinder Dogs

Anti-Friction • High Speed
 • Carbide Tipped —200
 Models, speeds up to 4000
 RPM, capacities to 200 tons.

RED E CENTERS

WORLD'S MOST ACCURATE PRECISION CENTERS



NOW!

DISTRIBUTOR STOCKED

At long last — RED-E CENTERS, with the **ACCURACY GUARANTEE** are made available to you through your distributor. Now you have a choice of sizes, types, shanks, tapers, heads and bearing assemblies for your every *turning* and *grinding* operation.

Satisfy your special need — conveniently, completely; obtain super finish, ultra precision unmatched accuracy — at no extra cost!

REPLACE WITH RED E and be Sure

YOUR DISTRIBUTOR IS READY TO SERVE YOU!

Call on him today! Literature available, of course, no obligation.

DISTRIBUTOR INQUIRIES INVITED

CENTER Specialists Since 1908

READY TOOL COMPANY

540 Iranistan Ave. • Bridgeport 5, Conn.

VISIT RED-E — ASTE, L.A., BOOTH 1025

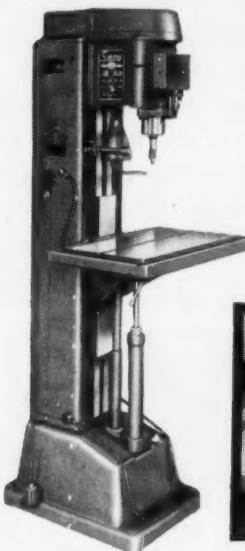
RED-E TOOLS

Quicker changeover, lower tooling costs...

with **SNOW** FULL
UNIVERSAL
MACHINES

Basic Master Fixtures for DRILLING, THREADING or TAPPING. Snow universal machines are the most flexible, most efficient, and most economical known. They save countless dollars in change-over time — help you start jobs sooner — assure quality at high production rates.

The square footage under a Snow Machine in your factory can be the most profitable in your whole plant. Submit details of your requirements.

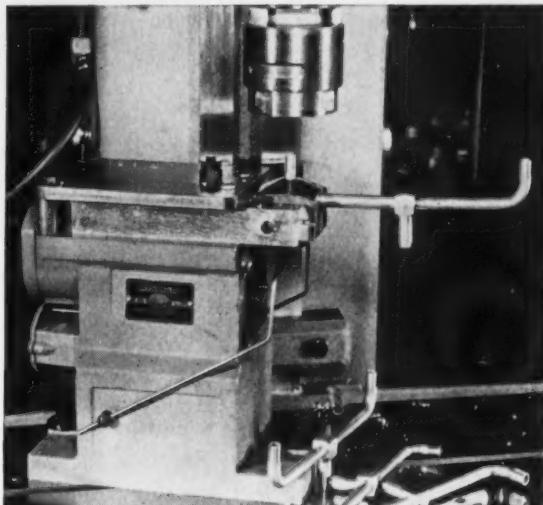


ELECTRICALLY OPERATED
AIR CONTROLLED
AUTOMATIC OR
SEMI-AUTOMATIC

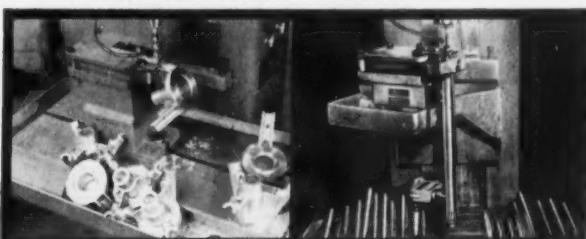
SNOW MANUFACTURING CO., BELLWOOD, ILL.

Irregularly shaped parts are easily handled. Front feed permits close setting of guide plate for greater accuracy with high production.

Here a short AIR VISE mounted on an offset table holds long tubing. Piece-part switch under table automatically closes vise and starts tapping operation.

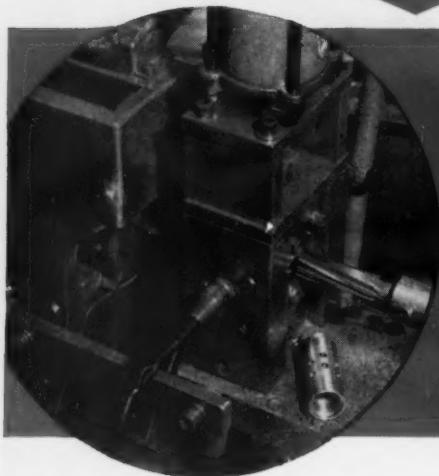


AIR VISE holds part firmly — self-centering — always in exact position for precision work. U-shaped wire underneath provides quick finger-tip control, automatically starting spindle cycle. Jaw inserts keep tooling costs at minimum. Blank jaws always in stock — can be toolled to fit your part promptly, inexpensively.



HIGH SPEED REAMERS ...

W & B



*More
Production
Less
Resharpening*

Shown above is the automatic reaming of fin assemblies for 60 M.M. mortar shells at Columbia Electric Products Company, Spokane. Standard Whitman & Barnes high speed reamers are used to remove the heavy burrs of 16 radially drilled holes in each piece. The reamers are operated at 800 R.P.M. and the production rate is 1,500 pieces per hour. The outstanding performance of these reamers is evident in the fact that Columbia Electric obtains 11,000 reamed fin assemblies per grind. For better reamer performance—specify W & B.

"Makers of Fine Tools Since 1848"

DRILLS, REAMERS, COUNTERBORES, COUNTER-
ENNS, TOOL BITS, CARBIDE TOOLS, SPECIAL TOOLS

W & B

Please send me additional information—

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____



Call

your W&B distributor

*for best service
and highest quality*

He can save you money
by supplying from his
stock . . . what you need
when you need it!

WHITMAN & BARNES

40050 PLYMOUTH ROAD
NEW YORK - CHICAGO

PLYMOUTH, MICHIGAN
LOS ANGELES - ATLANTA

4249A

February, 1955



External Grinder



Milling Attachment



Handlever Tailstock



Handlever Bed Turret



Telescopic Taper Attachment



Handwheel Collet Attachment



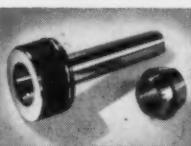
Handlever Collet Attachment



10 in 1 Tool Holder



Ball Bearing Live Center



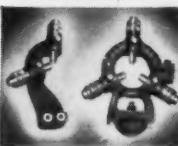
Adjustable Collet Bushing Chuck



Square Turret Tool Block



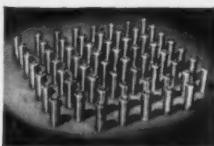
Handlever Double Tool Cross Slide



Telescoping Jaw Follower Rest and Center Rest



Collet Rack



Steel and Brass Collets



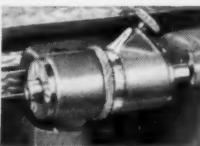
Step Chucks and Closers



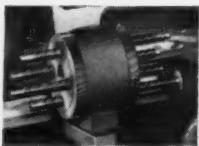
Centers and Drill Pads



Thread Dial Indicator



Micrometer Carriage Stop



Four Position Carriage Stop

SOUTH BEND
Lathe Attachments

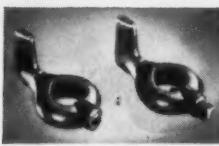
- Cut Production Time
- Simplify Difficult Jobs
- Increase Lathe Versatility
- Speed Up Tooling
- Perform Special Classes of Work
- Reduce Operator Fatigue

Write for Catalog 5418

SOUTH BEND LATHE
Building Better Tools Since 1906
SOUTH BEND 22,
INDIANA



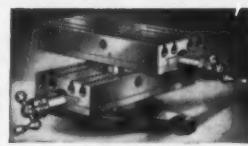

Four Position Cross Slide Stop



Safety and Standard Lathe Dogs



Coolant Pump



Universal Table

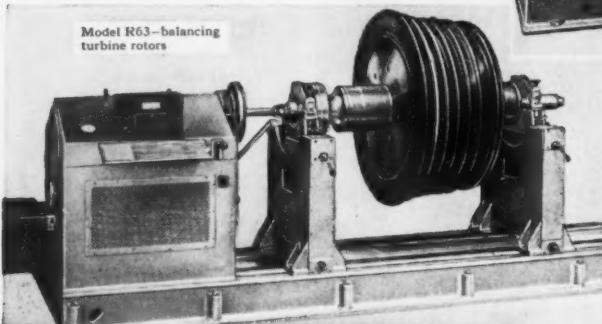
PRODUCTION ... BALANCING

WITH

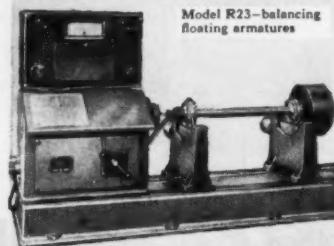
SCHENCK

ELECTRO-DYNAMIC BALANCING MACHINES

Now, in a fraction of a minute and in a single run, you can accurately determine the amount and location of dynamic and static unbalance on rotating parts. The SCHENCK Electro-Dynamic Balancing Machine has a sensitive and accurate electrical measuring system—without electronic tubes or oscilloscope—that will indicate unbalances caused by displacements as little as 0.00004" from the center of gravity. Simple and easy to operate, the SCHENCK Balancer, by coordinate measurement, quickly indicates on a Wattmeter the unbalance of the rotating part.



Model R63—balancing
turbine rotors



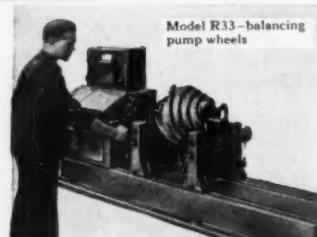
Model R23—balancing
floating armatures

The workpiece is balanced easily by adding or removing weight units at two of the four balancing points located within the coordinates, 90 degrees apart. For many production installations, Schenck Balancers combined with machine tools—check, correct and inspect parts in one set-up.

SCHENCK ELECTRO-DYNAMIC BALANCING MACHINES ARE THE RESULT OF 40 YEARS WORLD-WIDE EXPERIENCE. THEY ARE MADE IN MANY CAPACITIES TO BALANCE ROTATING PARTS WEIGHING UP TO 100 TONS.

Machine Type	R13	R23	R33	R43	R53
Measuring Range	1-22	3-66	1-220	3-660	11-2,200
(Weight of part in lbs.)					
Machine Type	R63	R73	R83	R93	
Measuring Range	33-6,600	110-22,000	330-66,000	1100-220,000	
(Weight of part in lbs.)					

Let Cosa Engineers recommend the proper Schenck Balancer for your needs. Or, send for detailed catalog.



Model R33—balancing
pump wheels

COSA — nationwide sales and service of precision machine tools —
— from bench lathes to boring mills.

COSA CORPORATION, 405 LEXINGTON AVENUE, NEW YORK 17, N.Y.



*it's slashing tool costs on
mass production
reaming jobs....*

This Staples Carbide-Tipped Shell Type Expansion Reamer has won unchallenged leadership for low cost, high precision reaming in mass production. In automotive, aircraft engine, household appliance, farm machinery and many other metalworking industries, this Staples tool is daily proving its ability to produce close tolerance, fine finish work at exceptional tool cost savings.

When the tool wears undersize, it can be accurately expanded to original diameter by driving the shell up the tapered arbor. After repeated sharpening and expansion, the tool is returned to new condition simply by replacing the worn shell—a standard stock item.

Enthusiastic comments from many manufacturers attest to the real savings this Staples Reamer produces. Try it on your production lines. Your inquiry will bring a prompt response.

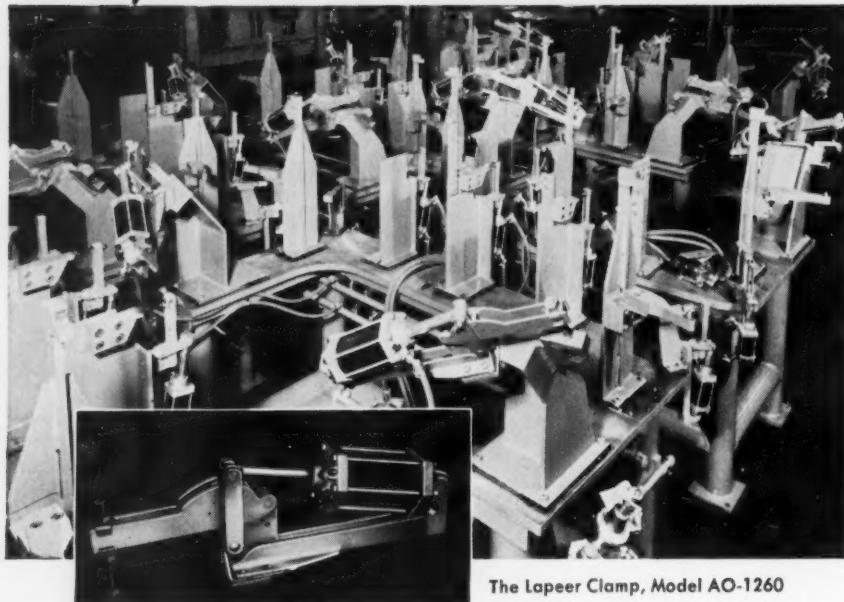
Staples

CARBIDE-TIPPED CUTTING TOOLS

A complete line of Circular Carbide-Tipped Tools, Expansion Reamers—Special Tools

THE STAPLES TOOL COMPANY
CINCINNATI 25, OHIO

Shot Welded IN 60 SECONDS!



Truck cowl and plenum assemblies for a leading automotive manufacturer are placed into position, clamped, and spot welded in 60 seconds by one operator as a result of these fixtures engineered by the Martin Electric Co., Detroit.

Important to the production record of this installation is the air-operated, toggle-action clamp made by Lapeer . . . 7 on each fixture. Because they go into action so quickly, they save operator time and fatigue. Because they hold the work so rigidly, the manufacturer attains new horizons in quality control.

It's entirely possible that you have a work-holding problem that will be quickly solved by Lapeer. Better write for information—today.



And send for this free catalog.

423B

**KNU-VISE
PRODUCTS**

3048 DAVISON ROAD

WESTERN DIVISION: 422 Magnolia, Glendale, California

LAPEER MANUFACTURING CO.

LAPEER, MICHIGAN

• CANADIAN DIVISION: Higginson Engr., Hamilton, Ontario



spot the champ

... and with high speed steels
the champion's always **REX**

Compare the freckles and you'll pick the champ. And it's easy to spot the champ in high speed steels, too, for Crucible REX® has been the *standard of comparison* for over half a century.

Prove the reasons for REX's superiority in your own shop. You'll like its hardenability . . . response to heat treatment . . . fine tool performance. Like thousands of other users, you'll agree *you can't find a high speed steel to outperform REX.*

Ask for REX, a *prescription-made* Crucible product, at Crucible warehouses or leading distributors from coast to coast. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pennsylvania.*

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

DEPENDABLE



HARTFORD SUPER-SPACERS

Super-Spacers are precision machined and designed to fit accurately and dependably between bearing rings. They are available in a wide variety of sizes and types to meet almost any requirement. Mounting can be done quickly and accurately. Installation is simplified by the use of a special tool.

THE HARTFORD SPECIAL MACHINERY CO., HARTFORD 12, CONN.

Johnson's Wax Cutting Fluids

"Johnson's guarantee speaks louder than claims"



Guarantee of Performance

Wax-Cool

We guarantee the superior performance of Johnson's Wax Cutting Fluids. The full purchase price will be refunded if any of the above products fail to meet the following conditions in your plant, in actual production, *provided* they are used according to our instructions.

Wax-Cut

TL-131 Coolant

- 1 Provide increased tool life.
- 2 Provide greater production where increased speeds and feeds can be employed.
- 3 Eliminate formation of undesirable deposits on machine tools.
- 4 Gain operator preference.

That's the story of extra profit possibilities in a nutshell. These Johnson's Wax products are stocked by a leading industrial supply house in your area. A shop test is easily arranged there ... or write:



S. C. Johnson & Son, Inc.
Industrial Products Division, Racine, Wisconsin



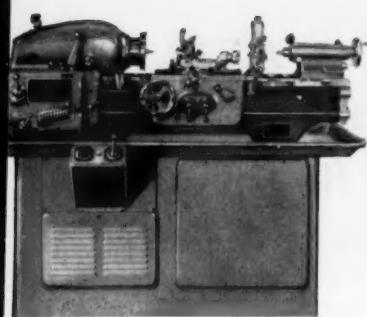
Announcing

the
Hendey machine division
of
BARBER-COLMAN COMPANY

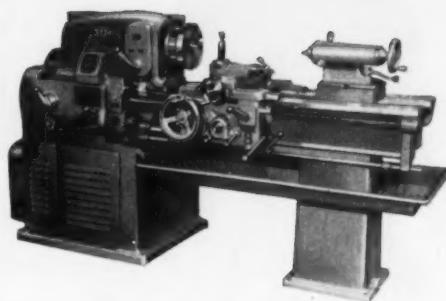
The manufacturing rights for the products of the Hendey Machine Company have been acquired by Barber-Colman Company. Hendey toolroom and production lathes and Hendey shapers will be manufactured by the Hendey Machine Division of Barber-Colman Company at Rockford, Illinois.

Barber-Colman will manufacture these lathes and shapers with all the special skills and techniques which have made its gear hobbing machines and hob sharpening machines of such outstanding quality. Users of Hendey machines will be afforded the same excellent service which Barber-Colman has always extended to its customers.

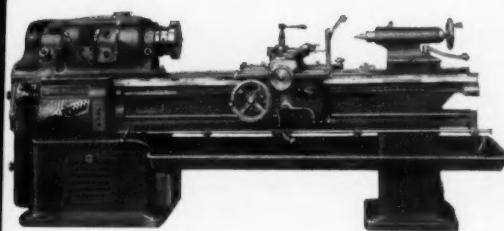
For further information about Hendey lathes and shapers, call your nearest Hendey representative or write to the Hendey Machine Division, Barber-Colman Company, Rockford, Illinois.



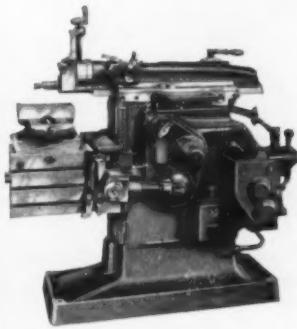
9" Tool and Gagemakers' Lathe



No. 2E General Purpose 14" Lathe



12", 14" and 16" — 18 speed Geared Head Lathe



12" High-Speed Shaper

Hendey machine division

BARBER-COLMAN COMPANY

211 LOOMIS ST., ROCKFORD, ILL.





"Just ASK ME about new angles on finishing!"

"RUBBER-CUSHIONED FINISHING GIVES YOU A COMPLETELY NEW SPEED-AND-PROFIT PICTURE! With Brightboy, you can *burr, clean, finish, polish*, in one operation, with time savings of as much as 50%!"

Now you can obtain Brightboy compounds either with ALUMINUM OXIDE or SILICON CARBIDE

abrasive grain. And each of these texture combinations comes in grain sizes ranging all the way from *extra coarse* to *extra fine*, in soft, firm and tough rubber binders. You get an abrasive exactly "matched" to your job, and a quality finish that's frequently the final polish. You get fast deliveries.

Brightboy's abrasive and rubber work together to give a combination-action that will be a revelation to you—a completely new concept of finishing—applications and time savings far beyond the range of other methods.

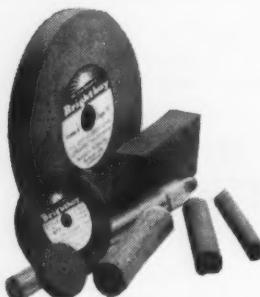
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BRIGHTBOY INDUSTRIAL DIVISION

WELDON ROBERTS RUBBER CO.

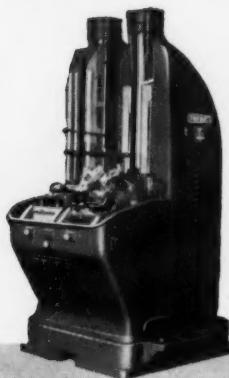
95 North 13th Street • Newark 7, N. J.

America's Pioneer Manufacturer
of Rubber-Bonded Abrasives



Wheels, Sticks,
Rods, Blocks
for machine and
manual operations





Duplex Surface
Broaching Machine.
Made in 5, 10, 15 and
25 Ton Sizes.



Single Slide Surface
Broaching Machine.
Made in 5, 10, 15 and
25 Ton Sizes.

A
FASTER
more economical
MACHINING
OPERATION

• Footbur Surface Broaching may be the answer to your problem of faster machining. Many jobs that were slow and expensive when handled by conventional machining methods are now being produced by Surface Broaching. Production in most cases is as fast as the speed at which parts can be loaded, yet cutting speeds are so low that the cost of tool maintenance shows great savings. Exceptional finish can be maintained. We will gladly discuss your machining problems with you.

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Cleveland 8, Ohio

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Continuous Type
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Made in 5 Sizes.

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SURFACE BROACHING



RELIEF

OIL BY-PASS VALVES

NEED NO MAINTENANCE

Precision-engineered to maintain pre-determined pressures on ram presses, machine tool hydraulic mechanisms, Diesels and oil-burning equipment.

Trouble-free.
Engineered for dependable, quiet,
constant performance.
**NON-CHATTERING . . .
no pounding noise**

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FULFLO
MECHANICAL
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BRASS OR
CAST IRON
For pressures
from 0 to 500
lbs.
Pipe sizes:
1/4" to 2".
Standard or
flange types.

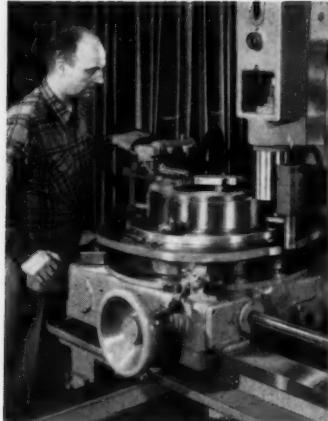
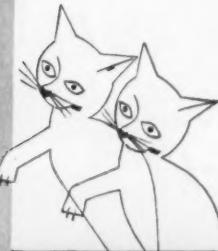


THE FULFLO SPECIALTIES CO. Inc.
BLANCHESTER, OHIO

ROCKFORD Hy-Draulic SLOTTERS

equipped with

Kopy-Kat duplicators



Cutting cam from tool-room-made master.



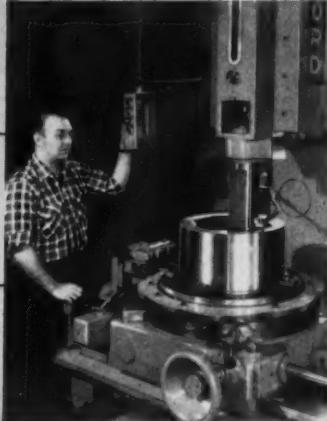
1. Tool Room Made Master



2. Functional Cam



3. Finished Die



Cutting new mold from functional cam.

Cut Dies Fast, Accurately, Economically

This manufacturer wished to duplicate blanking dies fast, accurately and inexpensively. A standard Hydraulic Slotter, equipped with a Kopy-Kat Duplicator, was used and this is how the job was done:

The tool-room-made master is placed on the Slotter. From it, the duplicator develops the functional cam. This cam is an enlarged projection of the die, in reverse, and is followed by the duplicator stylus in producing the finished dies. Sketches show the sequence of operations as performed.

Kopy-Kat equipped Hydraulic Slotters are readily adaptable to an almost endless variety of internal and external contour machining problems. A Rockford Machine Tool Co. representative can give you further details of the special advantages of the versatile Kopy-Kat Duplicator and how it may simplify your form machining work.



ROCKFORD MACHINE TOOL CO.

2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

Have You Tried a NORBIDE® Dressing Stick?



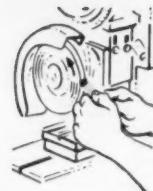
Just a couple of passes
with a NORBIDE Dressing
Stick . . . that's all it takes to . . .

A NORBIDE Dressing Stick of Boron Carbide — the hardest man-made material — will outlast hundreds of ordinary dressing sticks.

With this light, handy stick you can see more of the wheel and thus avoid costly over-dressing. You'll find it will greatly reduce dressing dust nuisance also.

Order a supply of these cost-cutting sticks from your local Norton distributor, or write for Form 1567 giving more details.

Clean up a wheel face



Form a radius or groove



Touch up a cup or saucer



NORTON COMPANY, 49 New Bond Street, Worcester 6, Mass.

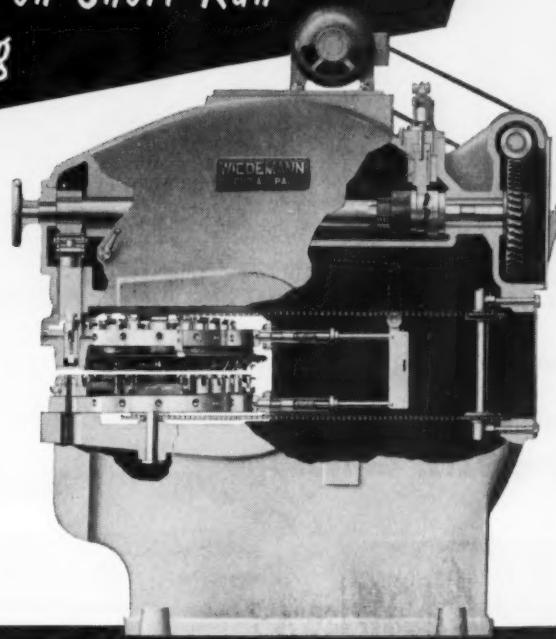


Next to the diamond in hardness —
available at a fraction of diamond cost

THE WIEDEMANN R-61 TURRET PUNCH PRESS

Pays Off on Short Run Piercing

- Eliminates 50% to 90% down time.
- Provides unlimited flexibility.
- Maintains close tolerances.
- Pays off in 2 years or less.



Holes are located and pierced in flat sheet metal or plates without layout or setup by the Wiedemann R-61. Rugged design and construction of this turret punch press assures many years of maintenance-free operation. The original investment is realized in production savings many times.

SEND FOR NEW R-61 BULLETIN

. . . describes in detail the application, operation and construction of the turret punch press.

WIEDEMANN MACHINE COMPANY

4219 Wissahickon Avenue, Philadelphia 32, Pa.



"We started to make money when we installed our first Moore Jig Borer in 1936"

SAYS AL STAUBER, MANAGING PARTNER,
DACO MACHINE & TOOL COMPANY



Some were pretty small! All were very accurate... Die and Stripper for piercing 47 holes in stainless steel sheet stamping were bored and jig ground by Daco on Moore equipment. Hole location was within ± 0.0002 ; hole sizes were held within ± 0.001 .

Now Daco, one of nation's best-equipped tool and die shops, has 5 Moore Jig Borers and 3 Moore Jig Grinders

The toolroom which has at its disposal modern methods for fast and accurate hole location will take complex work in stride—and make money. Al Stauber proved that when he installed, in 1936, his first Moore Jig Borer at Daco Machine & Tool Company, Brooklyn.

Soon a jig grinder took its place alongside. Daco then had the perfect hole location partnership—the jig borer to locate and bore the hole accurately... and the jig grinder to relocate and grind it after hardening (and also grind contours).

Now famous for instruments and instrument tooling, Daco uses 5 Moore Jig Borers and 3 Moore Jig Grinders for 90% of its hole locating and a good percentage of its contour grinding operations. All have been operated at least 50 hours weekly the last four years; several, through two shifts. Daco also has two Moore Panto-Crush Wheel Dressers and a Moore Die Flipper.

You can prepare for tomorrow's competition by writing today for literature describing Moore Jig Borers and Jig Grinders.

Moore Special Tool Company, Inc., 730 Union Ave., Bridgeport 7, Connecticut

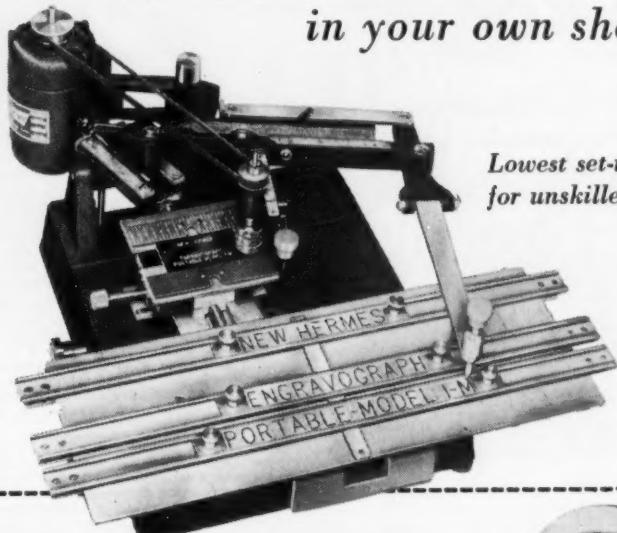
ADD TO YOUR TOOLROOM

JIG BORERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS • DIE FLIPPERS • MOTORIZED CENTERS • HOLE LOCATION ACCESSORIES

ENGRAVE

PLUG AND RING GAGES

in your own shop



*Lowest set-up time
for unskilled labor*



GAGES by BROWNE & LAIL, Santa Monica

Many leading manufacturers have found the NEW HERMES the most versatile portable engraver for rapid marking of tools—nameplates—panels—dials.

- Adjustable for 15 ratios.
- Self-centering holding vise.
- Automatic depth regulator.
- Adjustable copy holders.

Send for Catalog No. IM-27.

NEW HERMES ENGRAVING MACHINE CORP.
13-19 University Pl., New York 3, N. Y.

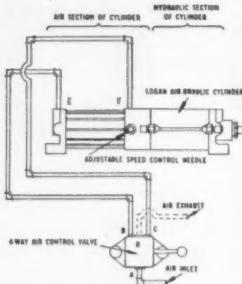
Logan

Air-Draulic® FEED CONTROLLED CYLINDERS

Combine The Fast-Acting, Economical
Low-Pressure Operation Of **AIR**
With The Smooth, Uniform
Controlled Regulation Of **OIL**

. for Pushing, Pulling, Pressing, Clamping, Holding,
Lifting, and Other Power Movements In Any Direction

Member—National Tool Builders Assn.
National Fluid Power Assn.

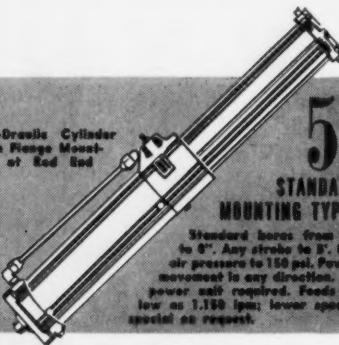


Basic AIR-DRAULIC Circuit
with 4-Way Control Valve
No Power Unit Required

Air-Draulic Cylinder
with Flange Mounting at Rod End

5

STANDARD MOUNTING TYPES



Standard bores from $\frac{3}{8}$ " to 8". Any stroke to 12". For air pressure to 150 psi. Power movement in any direction. No power unit required. Feeds as low as 1,150 lpm; lower speeds quoted on request.

NO POWER UNIT REQUIRED

Basically, Logan AIR-DRAULIC® Cylinders are air cylinders, and may be used wherever compressed air is available. Yet they provide the smooth, uniform, controlled feed which is normally obtained only in hydraulic cylinders.

Reduced to its simplest terms, the Logan AIR-DRAULIC Cylinder is an integral unit consisting of an air piston and a hydraulic piston mounted on a single rod. The thrust or pull of the rod is obtained by means of the air cylinder, controlled by a valve or valves in the usual manner. The two chambers in the hydraulic cylinder are connected externally in a self-contained circuit; an adjustable speed control valve in this circuit regulates the flow of oil and hence the speed of the rod stroke.

Rapid return is made possible by a check valve in the hydraulic piston, permitting unobstructed oil flow on the return stroke. Controlled feed in both directions is also available by omitting the check valve. Skip-feed can be obtained through the use of cam valves applied externally in the hydraulic circuit.

The hydraulic circuit is self-contained, and no power unit is required. Logan AIR-DRAULIC Cylinders can be equipped with an automatic oil filler if desired.

HOW TO INSTALL AIR-DRAULIC CYLINDERS

The basic circuit for installation of Logan AIR-DRAULIC Cylinders is shown at the left. The air section of the cylinder is connected in the same manner as a standard double-acting air cylinder, a 4-way air control valve, piping and a connection to the main air line being required. A hand-operated air valve is illustrated, but foot-operated or other types of air valves may be used. The hydraulic section of the cylinder is a self-contained circuit and requires no additional equipment or connections.

Piping is arranged from ports B and C on the air valve to ports E and F, respectively, on the air section of the AIR-DRAULIC Cylinder. Port A is the air inlet port and port D the exhaust.

The desired piston speed is obtained by setting the adjustable needle on the hydraulic section of the cylinder. Controlled speed may be obtained on the out-stroke, the in-stroke, or both, through the internal arrangements of the hydraulic cylinder.

Let Logan engineers help you design your
Air and Hydraulic Circuits. No obligation.

LOGAN MANUFACTURES 7,023 STANDARD CATALOGED ITEMS
FREE CATALOG ON REQUEST

AIR CONTROL VALVES, Cat. 100-4 • AIR CHUCKS, Cat. 79-1 • AIR CYLINDERS, Cat. 100-1 • AIR-DRAULIC CYLINDERS, Cat. 100-3 • AIR and HYDRAULIC PRESSES, Cat. 51 COLLET GRIP TUBE FINGERING, Cat. 200-1 • HYDRAULIC CONTROL VALVES, Cat. 200-4 HYDRAULIC CYLINDERS, Cat. 200-2 • 200-3 • HYDRAULIC POWER UNITS, Cat. 200-4 SURE-FLOW COOLANT PUMPS, Cat. 42.

Logan



LOGANSORT MACHINE CO., INC.
801 CENTER AVE., LOGANSORT, IND.

...a new concept of the...

BULLARD

MULT-AU-MATIC

Since 1914 Bullard Mult-Au-Matic have been widely used in many industries requiring high production of parts with repetitive accuracy.

The **MULT-AU-MATIC** Type "L" incorporates many new developments.

Here are some of them:

★ CONTROL SYSTEM

All functions of the machine are controlled from conveniently located push buttons with minimum operator effort and maximum safety.

★ FEED MECHANISM

Completely new screw type feed works provide a 16" stroke with 81 feed changes ranging from .0025 to .0625.

★ SELECTIVE SPINDLE SPEEDS

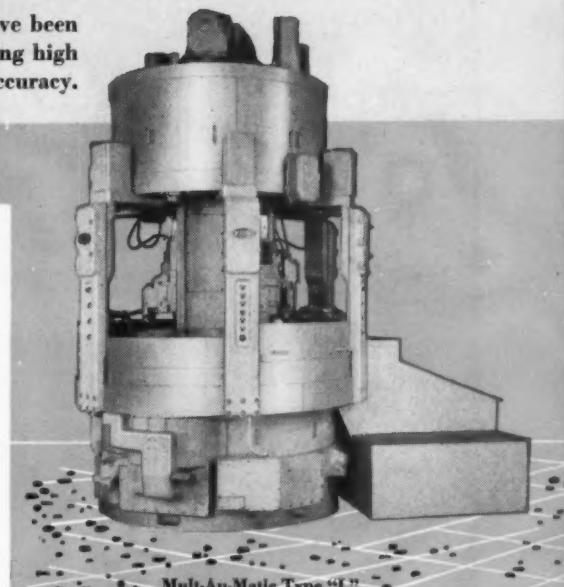
At each station, speed range from 35 rpm to 1,000 rpm allows selection of correct cutting speed to suit operation at each station.

★ CARRIER INDEX

New mechanism permits faster indexing of carrier which saves time between cuts.

★ OPTIONAL EQUIPMENT

Includes multi-purpose heads, drill heads, tapping heads, precision boring heads, automatic loading and gauging equipment and chip removal conveyors.



Mult-Au-Matic Type "L"

Available in three sizes
10" with 6, 8, 12 or 16 spindles,
14" and 18" with 6 or 8 spindles.



THE BULLARD COMPANY

286 Canfield Avenue • Bridgeport 2, Connecticut

Please send me a copy of the
NEW MULT-AU-MATIC TYPE "L" CATALOG

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COMPANY _____ POSITION _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

For the complete story use this coupon
for your copy of the new catalog.

**For less tumbling time
... lower finishing costs**

Borolon®

TRADE MARK

**TUMBLING
ABRASIVE**

HARD • SHARP • TOUGH • UNIFORM



Fused crystalline aluminum oxide . . .
in lumps, nuggets, chips,
grit or grain. Borolon tumbling
abrasive cuts fast and is the ideal mass
media for deburring, removing flash and bead,
putting a radius on small parts . . . and giving a
precision finish even to micro-inch specifications.

Full range of sizes. Send for catalog bulletin ESA 236.

SIMONDS
ABRASIVE CO.

PHILADELPHIA 37, PA.

BRANCH WAREHOUSES: BOSTON • DETROIT • CHICAGO • PORTLAND • SAN FRANCISCO • DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N.Y. Simonds Canada Saw Co. Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

Only 7" high,
OMNI-VISE is lowest
in the trade.

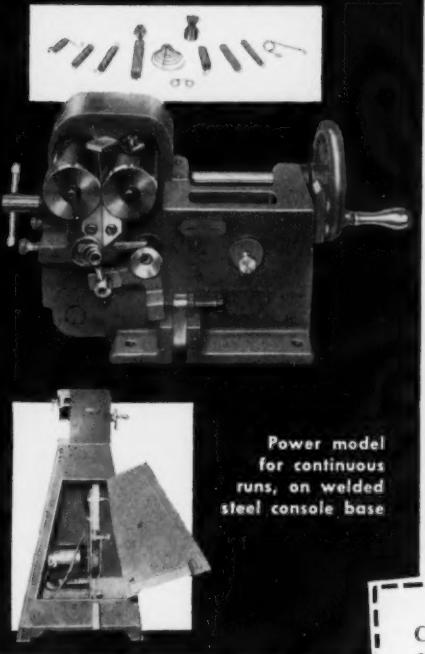


Hold any machine work at any EXACT angle with sturdy OMNI-VISE!

Accurately set in all three planes in only 15 seconds, this sturdy precision vise made in two capacities saves time and headaches for progressive shop operators and pays for itself quickly. Only 7" high (lowest in the trade), OMNI-VISE #4, shown at top, is tough, weighs 74 lbs. Jaws are 4" x 1½", open to 4". Base is 9" in diameter with one side straight. Inset shows OMNI-VISE #2, a precision low-priced vise. Users find it exceptional for grinding compound angles on carbide tools. Weight, 16 lbs. Height, 4¾". Jaws, 2½". Opening, 2½". Base, 7¼" x 5". For grinding, drilling or general work at any angle, by hand or machine, an OMNI-VISE is the machinist's choice.

Make any type spring, without arbors, FAST with Perkins Spring Coiler!

When you need a replacement or experimental spring, any shape, diameter or pitch from flat or round wire sizes .005" to .125", you can produce it in a matter of seconds with the new Perkins Precision Spring Coiler! You entirely eliminate the use of arbors, yet turn out precision springs — torsion, compression, extension tapered, or special springs — coiled either left or right hand, in any desired length, any diameter from 1/16" to 12" and larger, with or without initial tension, and with open or closed ends. Eliminate expensive special orders and costly production delays! Make your own springs to exact specifications for replacements or experimental work. Make them fast right in your own shop!



Power model
for continuous
runs; on welded
steel console base

EXCLUSIVE DISTRIBUTORS OF
PRECISION MACHINE
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Please send detailed information and
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PERKINS SPRING COILER

hand power

OMNI-VISE #4 #2

Name _____ Title _____

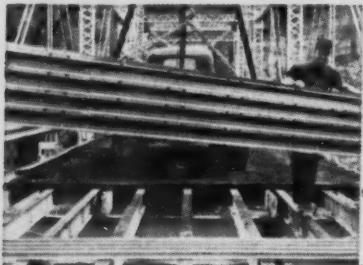
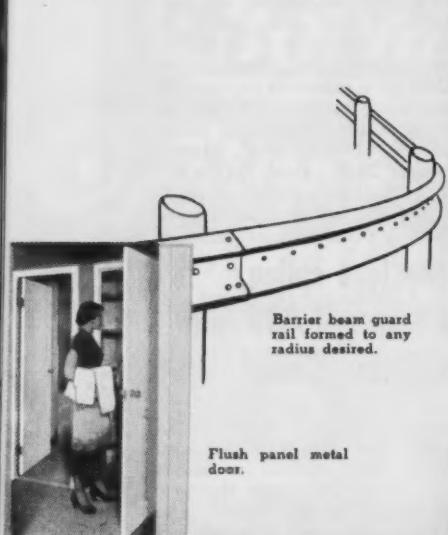
Company _____

Address _____

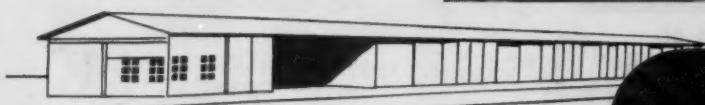
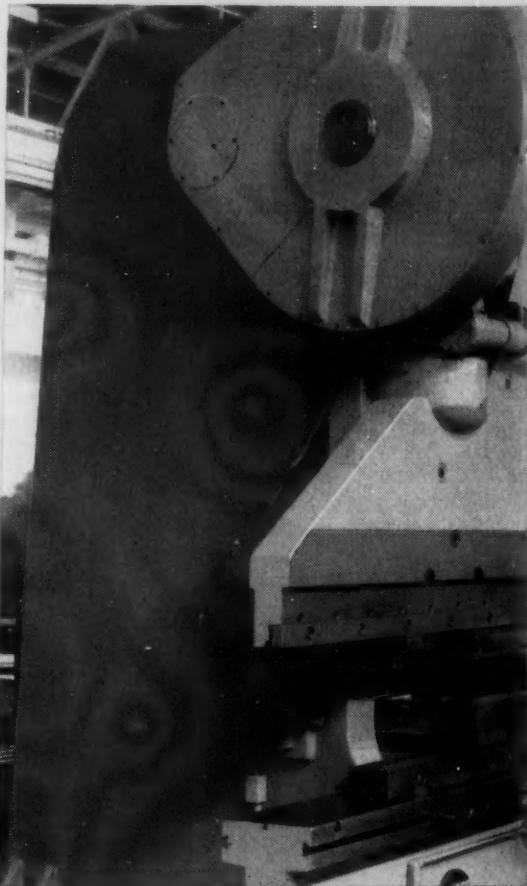
City _____ State _____

this CINCINNATI

is giving accurate and versatile performance at



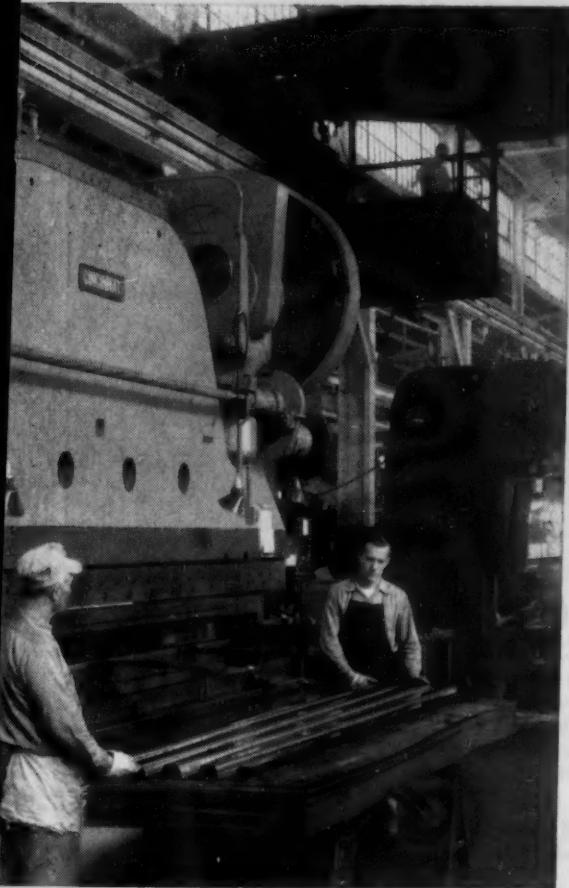
Formed structural bridge flooring



Permanent yet portable steel building

PRESS BRAKE

UNITED STEEL FABRICATORS, Inc.



Photos courtesy of United Steel Fabricators, Inc., Wooster, Ohio



All steel buildings of a thousand uses

WITH ample capacity, this powerful 500 Series Cincinnati Press Brake with 18' 6" clearance between housings and 22' die area—handles formed structural bridge flooring, guard rails, steel doors. Girders and side walls for various types of metal buildings are also produced. United Steel Fabricators, Inc. are pleased with the accuracy in forming and ease and speed of operation which are important factors in this economical production.

INVESTIGATE:

- Cincinnati Center Line Loading
- Cincinnati Interlocked Construction
- Cincinnati Rigid Deep Beds and Rams

Write for the latest Press Brake Catalog B-4.

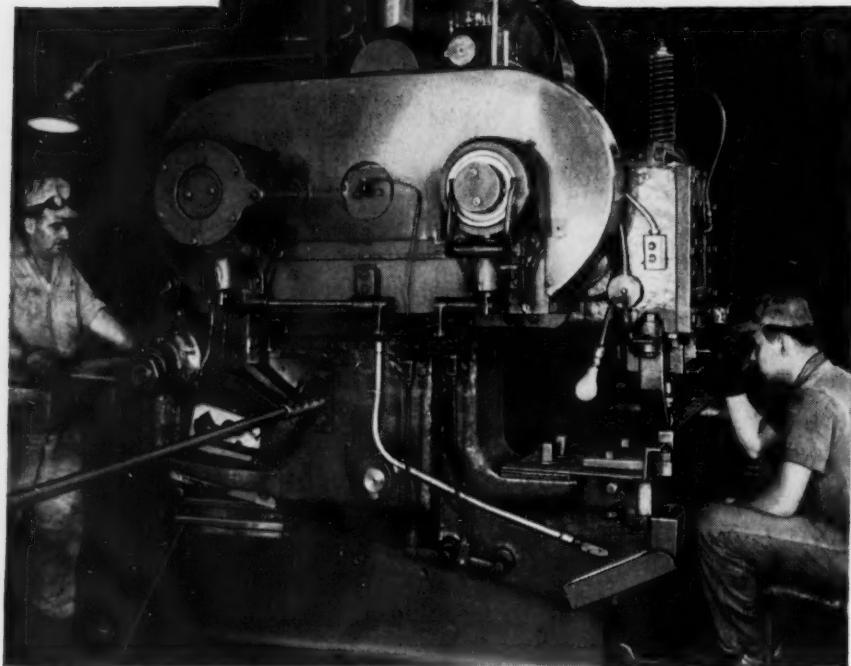
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES



16 HRS' WORK
from an
8-HOUR SHIFT!



Kling COMBINATION Shear, Punch & Coper...

Not only can two men do two different jobs on the Kling Combination simultaneously ... but each of the men at various times can perform many different operations with it. These jobs include Shearing Bars or

Angles, Coping Angles or Channels, Slitting, Punching or Notching ... and half a dozen more jobs. Yet this Kling Combination Shear, Punch and Coper costs little more than a single-end punch, which it replaces.



For more data on Kling Combination and other metal fabricating machines, write for descriptive bulletins.

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1320 N. Kostner Avenue, Chicago 51, Illinois; Export Distributors:
Simmons Machine Tool Corporation, 50 East 42nd Street, New York 17, N.Y.

...an investment in speed!

Since 1892 **Kling**

749 MT

Friction Saws



Double
Angle Shears



Punches

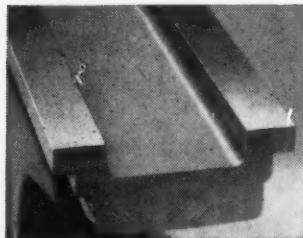


Plate Bending Rolls



Above: Bed and Headstock are cast integrally to form an extremely heavy unit and to provide the rigid foundation for all types of work.

Below: Block type ways are straddle keyed to the bed and ground in perfect alignment with the spindle. All working surfaces are hardened to 64-66 Rockwell "C".



ACCURACY that doesn't "wear off"

Here are two good reasons why you can count on the accuracy of Gisholt Turret Lathes—now and years from now.

One-piece bed and headstock, cast as a heavy, rigid unit, reduce distortion and vibration to a minimum. Headstock is jig-bored to insure—and maintain—perfect alignment of spindle and drive shafts, with ample metal to provide the most solid support possible.

Hardened steel ways are augmented by hardened steel strips secured to the ram saddle, as well as hardened steel gibbs and clamps, making an assembly that is virtually wear-proof. Its accuracy is further preserved by force lubrication. These advantages are yours for the long life of any Gisholt Turret Lathe. Ask for complete details.

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



GISHOLT

MACHINE COMPANY

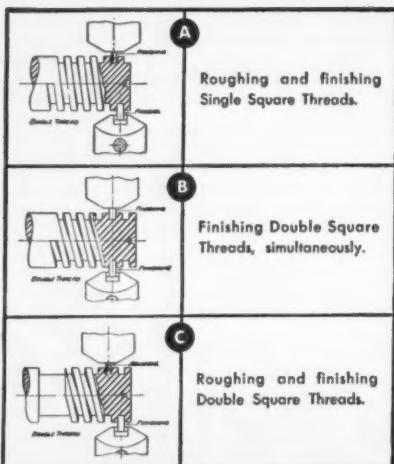
Madison 10, Wisconsin

How Do Coulter Automatic Threading Lathes SAVE TIME, MONEY, LABOR?



*Because they are designed to permit over
25 alternatives for setting up the threading
tool to meet specific applications.*

For example:



THE "L1" is the most versatile of any threading Lathe, for the production of Square, Standard and 29° threads, internal or external . . . and it does it faster, better — AUTOMATICALLY!

Without obligation, consult our engineers with your specific threading problem. Catalog and machine specifications available upon request.



James Coulter
Machine Co.
641 Railroad Ave., Bridgeport 5, Conn.

Machine Tool
BUILDERS
Since 1896

Let DAVIS cut your Boring Costs 2 ways

WITH Standard Tooling ITEMS
FROM INDUSTRY'S MOST COMPLETE LINE

IN STANDARD BORING HEADS ALONE DAVIS PRODUCES AND CATALOGS OVER 133 DIFFERENT SIZES AND TYPES.

Every boring job in your shop...regardless of range, material or complexity...can be done faster, cheaper and with greater precision, when you make Davis your tooling headquarters. That's because only Davis has both the complete line and broad machining experience to supply or design exactly the right tool for your work.

Davis tooling specialists help you immeasurably in selecting the right tool from industry's broadest standard line. Their unrivaled background of practical shop experience assures recommendations that exactly meet all your requirements for tolerances, finish, speeds, feeds and maximum tool life at minimum cost.

WITH Job-Engineered SPECIALS
FROM INDUSTRY'S FOREMOST DESIGNERS

Where work is beyond the scope of standard tools or where efficiency can be improved or costs reduced by combined operations, special fixturing, etc., the specialists in Davis Engineered Tooling Service will work with you in developing tools for even the most complex application. Consult your local Davis field engineer or send us complete work details for important recommendations.

DAVIS

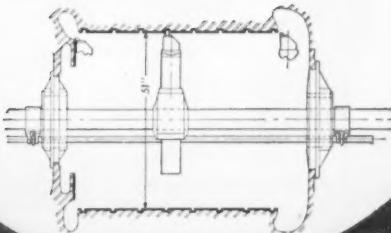
BORING TOOL DIVISION

of Glideways & Lewis Machine Tool Company
Fond du Lac, Wisconsin

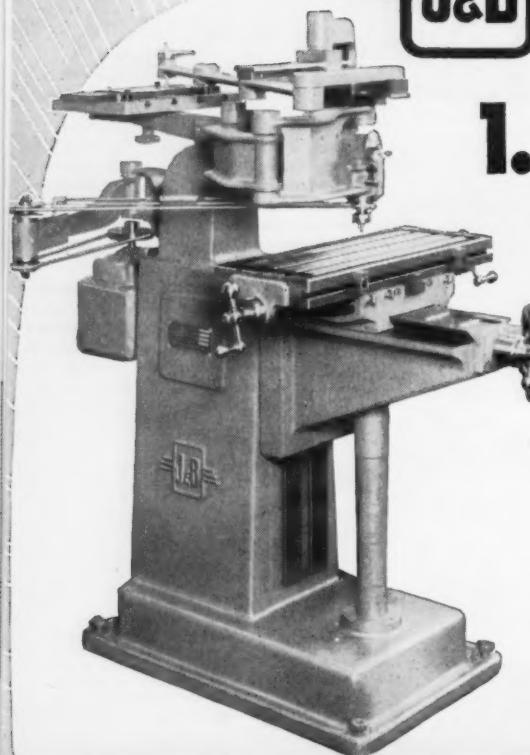
THE ONE NAME THAT CERTIFIES ULTIMATE PRECISION AND PRODUCTIVITY IN TOOLING



TYPICAL OF DAVIS SPECIAL TOOL DESIGNS IS THIS EXTENSION BORING HEAD WHICH BORES, FACES AND GROOVES A 5 $\frac{1}{2}$ " DIAMETER HOLE.



FROM



1. 4-PURPOSE PRECISION PANTOGRAPH

The "*Panto-Miller*"

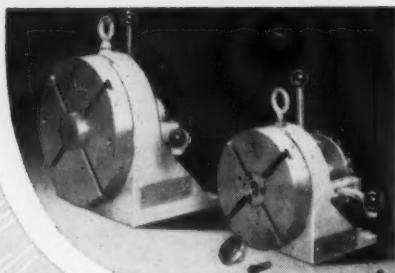
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- Profiles
- Die Cuts
- Mills

A sturdy, production tool for 2-dimensional cutting in steel, cast iron, non-ferrous metals and plastics.

Pantograph reductions from 1:1 to 1:40. Spindle speeds infinitely variable from 1,200 to 11,500 RPM without belt changing.

Extreme accuracy and freedom of motion. Write for "*Panto-Miller*" details.

JOHNSON & BASSETT, INC. Production Tool Div.
BOX 1251, WORCESTER, MASSACHUSETTS, U. S. A.



2. RAPID, ACCURATE JIG POSITIONING

This indexing trunnion, with station selector, accurately holds and locates either jig or work. SIMPLIFIES JIGS. REDUCES SET-UP TIME.

Ask for "TRUNNION" information

THE **CORRECT** BLANCHARD WHEEL
GETS YOUR NOSE OFF THE GRINDSTONE

... WITH **BEST SURFACE
GRINDING RESULTS!**



BLANCHARD SURFACE GRINDERS give you peak production and economy when maintenance is performed on schedule, and when you use the best wheel for each job.

For more than 25 years, Blanchard has been making wheels that do their jobs in less time, with less trouble and cost . . . whether the work is tough as copper or fragile as glass . . . whether it requires heavy roughing cuts or clean-up cuts with flatness of .000005" to .000010" and finish of 1 to 3 micro-inches.

Our quarter century of experience has proven that Blanchard grinders perform best with Blanchard wheels...on every job!

SEND

FOR OUR NEW,
FREE FOLDER

on Blanchard cylinder, sectored and segment wheels —
in silicate, resinoid and vitrified bonds.

PUT IT ON THE



THE BLANCHARD MACHINE CO.
64 STATE STREET • CAMBRIDGE 39, MASS., U. S. A.

Gentlemen:

- Please send new *Blanchard Wheel and Segment folder*.
- Please send *The Art of Blanchard Surface Grinding*.

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TITLE _____

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STREET _____

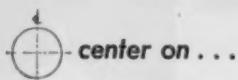
CITY _____ ZONE _____ STATE _____

'LATHEDOG' LEARNS ABOUT CABINET BASES

LATHEDOG, STORE THAT STEADY REST, TURRET, TOOL POST AND THEM CHUCKS IN THE CABINET BASES OF YOUR LATHE! SOMEBODY'LL TRIP ON THEM OUT HERE ON THE FLOOR!

CHEE, BOSS,
WHERE'LL I PUT
MY LUNCH, MAG-
AZINES, GYM
SHOES, HAT AND
COAT IF I USE
THEM CABINETS
FOR TOOLS?

THE BOSS SHOULD'A
COME BY LAST WEEK
WHEN LATHEDOG
WUZ KEEPIN' WHITE
MICE IN THEM
CABINET
BASES!



For a clear comparison of Cincinnati Lathes with other equipment, write for a free copy of "Management Facts About Lathes."

cincinnati

J.R.WILLIAMS

YEAH! THEY
SQUEAKED SO
LOUD LATHEDOG
THOUGHT IT WUZ
THE LEAD SCREW
AND KEPT USIN' THE
OIL SHOT
PLUNGER!



3 by NEA Service, Inc.

Large size prints of this J. R. Williams cartoon are available for framing.



It's amazing the amount of stuff you can store in those handy cabinet bases. But even more amazing is the number of high-priced features you'll find on low-priced Cincinnati Lathes.

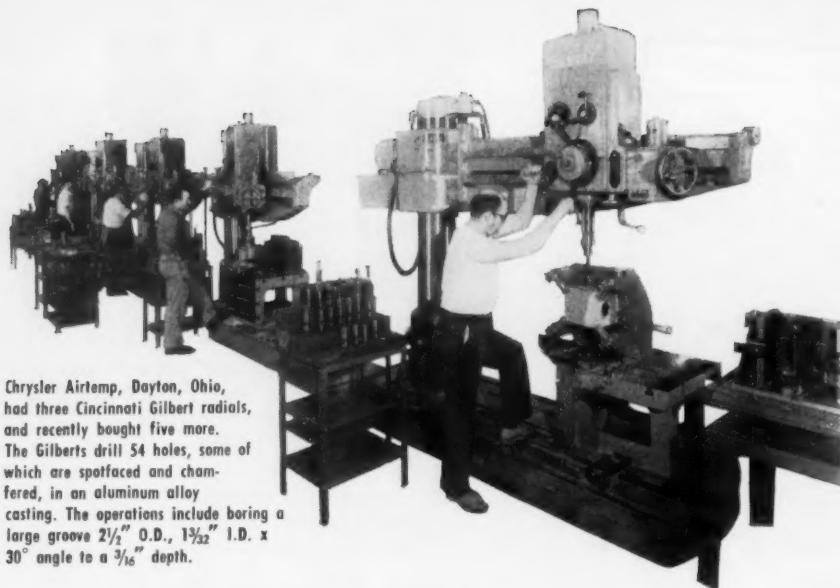
1. All geared headstock
2. 12 spindle speeds in geometric progression
3. Direct-reading speed-shifting mechanism
4. Large spindle mounted in three antifriction bearings
5. Flame hardened gears in headstock, quick change box and apron
6. Cabinet legs with built-in leveling jacks
7. Enclosed quick-change box with lead-screw reverse
8. One shot lubrication of ways
9. Ground ways (flame hardened at extra cost)
10. Tray-Tops on headstock and tailstock
11. Double-walled apron with automatic lubrication
12. Fully enclosed electrical panel, built-in disconnect, transformer, motor and controls (all standard equipment)

We also make a complete line of floor, bench and radial-type drilling machines.

For complete catalogs, prices and name of your local dealer, write on company letterhead to Cincinnati Lathe & Tool Co., 3260 Disney, Cincinnati 9, Ohio.

lathes and drills





Chrysler Airtemp, Dayton, Ohio, had three Cincinnati Gilbert radials, and recently bought five more. The Gilberts drill S4 holes, some of which are spotfaced and chamfered, in an aluminum alloy casting. The operations include boring a large groove $2\frac{1}{2}$ " O.D., $1\frac{3}{32}$ " I.D. x 30° angle to a $\frac{3}{16}$ " depth.

They bought five more...

because **Gilberts produce more.** Ease of operation explains in part why Gilbert radials produce more in so many plants. For example, all speed and feed controls are on the head, within easy reach of the operator even when the arm is in its highest position. Direct reading speed and feed plates eliminate time-consuming calculations. You get instant finger-tip shifting of speed and feed levers. The four-lever feed turnstile puts one lever always within handy reach. Other easy-operating features: finger-tip clamping of the head to the arm; instantaneous one-lever arm con-

trol (unclamps, raises, or lowers the arm in one easy motion); effortless head traversing due to balanced, ball-bearing mounting; adjustable electric light at the spindle.

Gilbert radials have 9 or 11-inch columns; 12 spindle speeds in each of 3 ranges; 6 power feeds, .003" to .020". Tap leads are available. *Delivery in 30 days or less.* As the Chrysler Airtemp story shows, "those who buy Gilbert buy Gilbert again." Get full data on the Gilbert's many advantages.

Write for Bulletin 349 today. ▼

GILBERT

RADIALS • BORING MILLS • ACCESSORIES

THE CINCINNATI GILBERT MACHINE TOOL CO., 3366 BEEKMAN ST. • CINCINNATI 23, OHIO



Easier, Faster, Better Scraping AT LOWER COST



The Anderson Power Scraper puts scraping on a high-production basis but controls quality as closely as possible. Quick, easy, modern way to scrape hard scale, carbon deposits, etc., from metal surfaces or for oil-tight, steam-tight, and air-tight fits.

EASIER SCRAPING because the operator guides it as he wishes, without spending strength on pressure . . .

FASTER SCRAPING because he works without tiring — without losing speed . . .

BETTER SCRAPING because perfect control enables him to work more uniformly . . .

AND LOWER COST SCRAPING because a motor does the heavy cutting and enables one man to do the work of several men. For example:

5-Hour Job Cut To 50 Minutes

One user was scraping flat pieces 18" by 24" — a job that had taken 5 hours by hand. An Anderson Power Scraper cut the time to 50 minutes! Another user reports: "Our men like the Anderson Power Scraper very much, especially for the heavier work, which we formerly had considerable difficulty in getting a man to do. It has taken the work out of scraping."

Write today for more information on the savings and advantages of using an Anderson Power Scraper."

MAIL COUPON FOR CIRCULAR — PRICE — DELIVERY

QUICK CHECKLIST OF FEATURES

Natural hand control — as easy to use as any hand tool • Stroke easily adjustable from $\frac{1}{4}$ inch to $3\frac{1}{2}$ feet • Scrape right up to a shoulder without slowing down • Forward stroke 60 feet per minute • Reverse stroke 90 feet per minute • Automatic safety control shuts off current if motor is overloaded • Portable — plugs into any outlet • Has handy tool shelf and self-contained grinder for sharpening blades at machine • As easy to use on a small surface as on a large bearing.

ANDERSON BROS. MANF. CO.

Rockford, Illinois

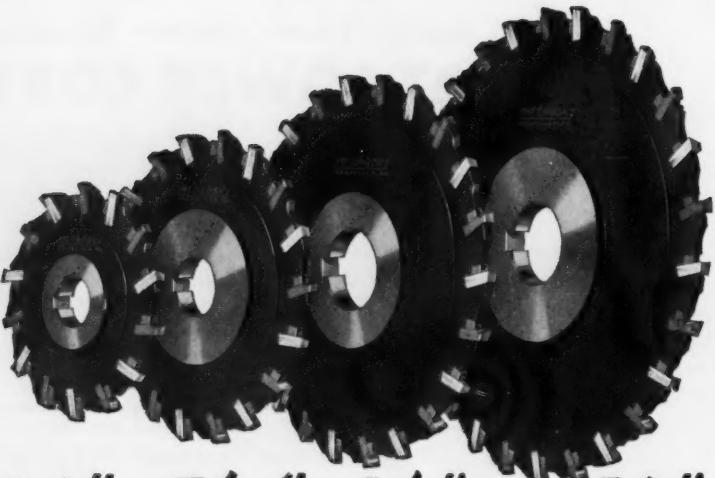
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NAME.....

ADDRESS.....

CITY..... STATE.....

ANDERSON BROS. MFG. CO., ROCKFORD, ILLINOIS



$3/8''$ - $7/16''$ - $1\frac{1}{2}''$ and $5/8''$

THIN SLOTTING CUTTERS

$4''$ - $5''$ - $6''$ - $8''$ - $10''$ and $12''$ in diameter

with Jack-Lock® blade locking wedges

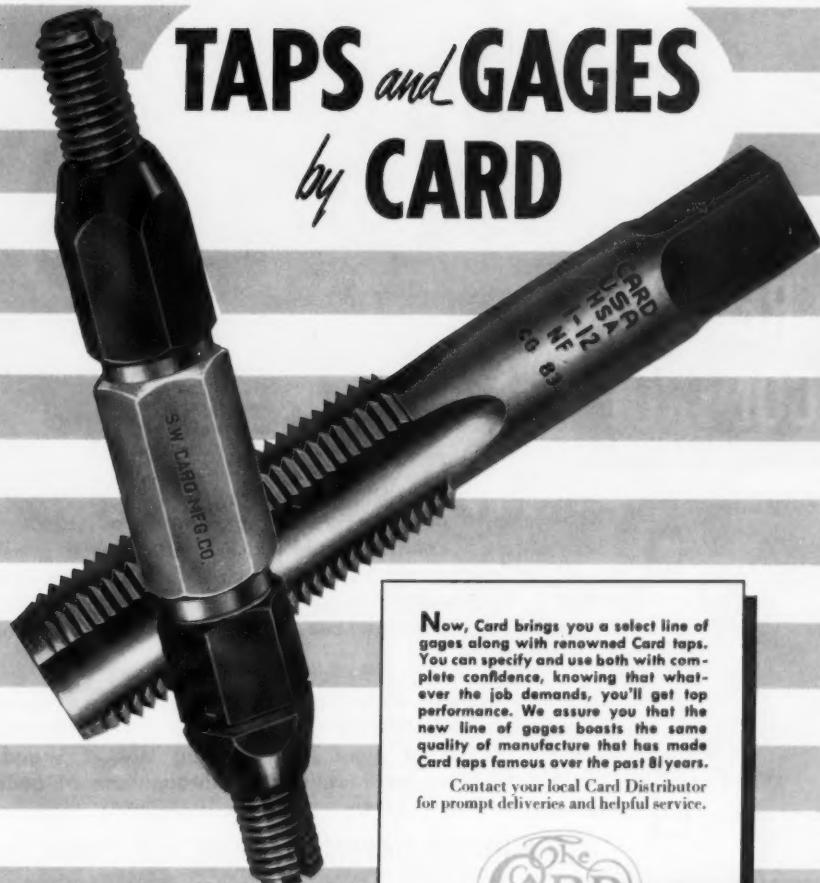
• Developed by McCrosky, these new cutters combine the rigidity of solid slotters with the greater economy — longer life — the easy, positive locking of each blade — and the quick release and accurate blade adjustment of McCrosky's shop-proved Jack-Lock Wedge. Locking pressure of the wedges against the alternate right and left hand milled and ground blades is parallel to the sides of the cutter, avoiding any side stress, warping or misalignment. Easily converted into half side cutters by simply inserting blades all of one hand. New bulletin gives dimensions and full details. Write for Bulletin 17-M today.



MCCROSKEY TOOL CORPORATION
HEADVILLE, PA.

Engineering and Sales Representatives in the Principal Cities

TAPS and GAGES by CARD



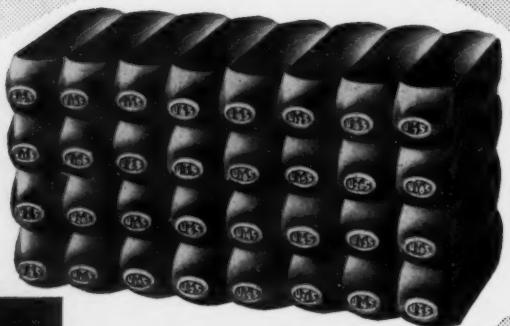
Now, Card brings you a select line of gages along with renowned Card taps. You can specify and use both with complete confidence, knowing that whatever the job demands, you'll get top performance. We assure you that the new line of gages boasts the same quality of manufacture that has made Card taps famous over the past 81 years.

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S. W. CARD MANUFACTURING CO. MANSFIELD, MASS.

Division of Union Twist Drill Co. TAPS • DIES • SCREW PLATES • GAGES



RETAIN CONTROL

with INSPECTION and
CODE STAMPS



These inspection and code stamps enable a manufacturer to retain control of his product wherever it goes. A single glance can provide such information as the identity of a welder, inspector, operator, or assembler—heat number, lot number, material or date of manufacture.

Choose your own code from any of 300 stock designs, available in any desired size, in either the economical HI-DUTY Brand or even longer-lasting HI-LOY Brand. You'll get permanent identification through use of code designs, with key letters or figures if desired.

"IF IT'S WORTH MAKING, IT'S WORTH MARKING"...

Geo. T. Schmidt marking engineers will help you develop a code control plan without obligation. Write for particulars.

GEO. T. SCHMIDT, INC.

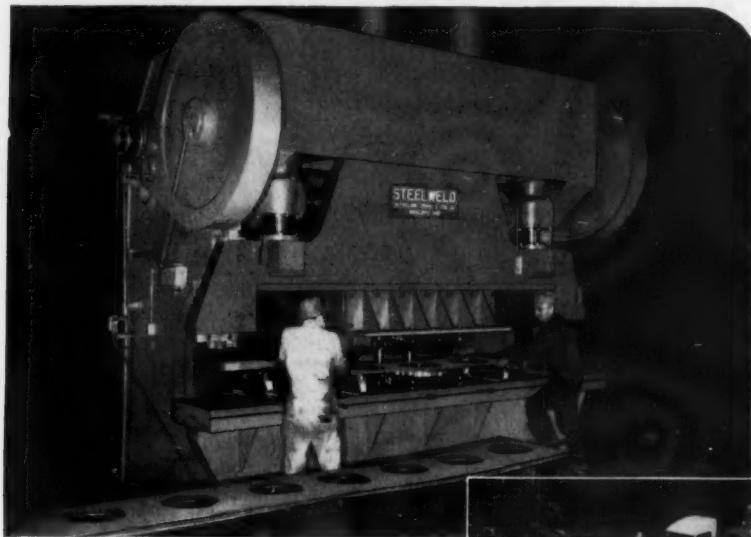
1806 West Belle Plaine Avenue

Chicago 13, Illinois



Punches 15" Holes For Warner & Swasey Gradalls

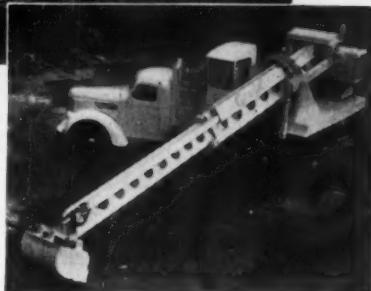
Also Performs Bending and Flanging Operations



Practically all of the steel plate on Warner & Swasey Gradalls, manufactured at their New Philadelphia, Ohio plant, is formed, punched and flanged on a Steelweld Press which is designed to brake steel plate up to 16' x $\frac{1}{2}$ ".

One of the more interesting jobs done on this machine is the punching of 15" diameter holes in Gradall boom plates, followed by a flanging operation. Through use of special movable punches, many smaller holes of various sizes are made at a time, in locations as desired.

The versatility of Steelweld Presses to handle efficiently many varied operations has proven of tremendous advantage to many users. You, too, may find the many features of these machines of great help. A representative will be glad to give you the details.



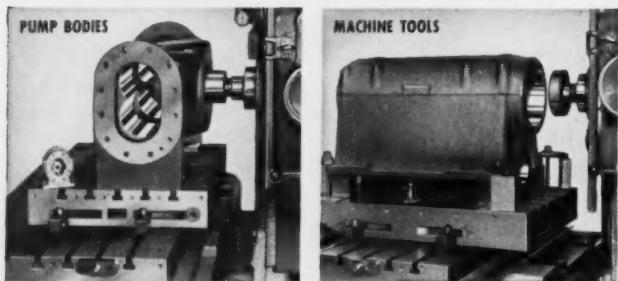
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CATALOG No. 2010 gives
construction and engineering
details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

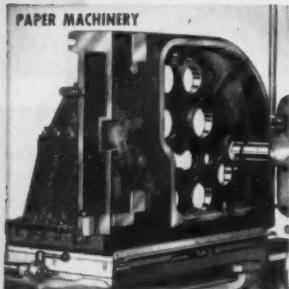
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STEELWELD
BENDING PRESSES
BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING

The De Vlieg System of
***JIGLESS PRODUCTION**
... eliminates expensive boring jigs!

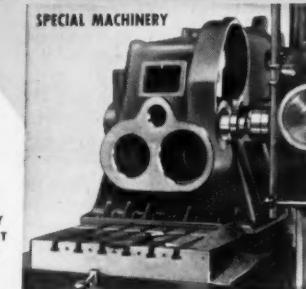


TYPICAL EXAMPLES OF JIGLESS PRODUCTION ON DE VLIEG JIGMILS



*The
JIGMIL Technique:*

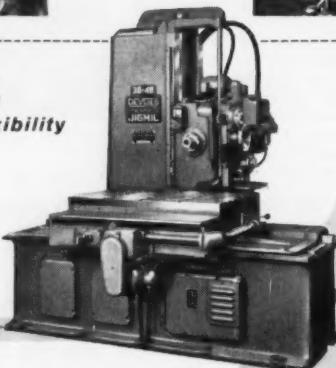
- ELIMINATES SPECIAL BORING JIGS
- REDUCES MACHINING TIMES
- PERMITS USE OF SIMPLIFIED TOOLING
- IMPROVES ACCURACY WITH RESULTANT CUT IN ASSEMBLY COSTS



*The De Vlieg System
of Jigless Production
permits complete flexibility
of product design!*

If your shop is burdened with costly boring jigs and special tooling, it will pay you to investigate the

DEVlieg SPIRAMATIC JIGMIL



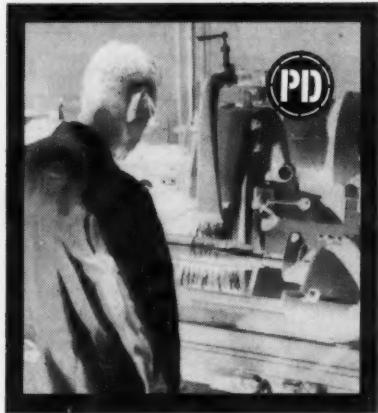
**Come to
Detroit—*

see a practical demonstration of the
JIGMIL TECHNIQUE

*Write
for comprehensive
Illustrated Catalog*

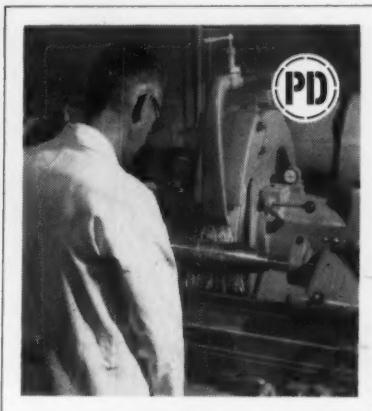
DEVLIEG MACHINE COMPANY • 450 Fair Ave., Ferndale • Detroit 20, Mich.

A remarkable development that can save you money



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grinding wheel each and every time through
the CINCINNATI (PD) Manufacturing Process.

Just as a NEGATIVE guarantees you an exact
duplication of a photograph each and every time,
you are always assured a . . .



NOW!
Cincinnati Grinding Wheels offer
 **Positive
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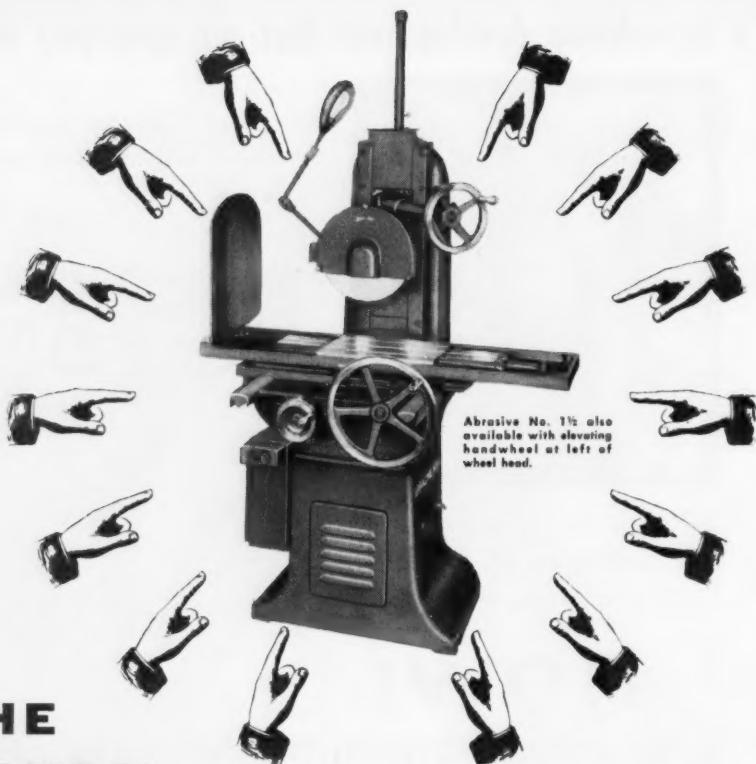
It's true! Positive Duplication can *save you* money . . . and *increase your production*! Through the CINCINNATI (PD) Manufacturing Process you get a Positive Duplication of the original wheel *every time* you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind *exactly alike*. Yet they are priced no higher than ordinary wheels.

Let us prove to you how CINCINNATI (PD) WHEELS can save you money and increase your production. Just contact us and

we'll send one of our representatives. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.



A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.



THE HANDY SURFACE GRINDER

ABRASIVE No. 1½ is the hand feed toolroom grinder designed for maximum handiness. Handiness — to quickly produce different jobs regardless of size, with its 15" x 10" work table. And handiness that pays off in toolmaker popularity. Large convenient handwheels, for controlling depth of cut and longitudinal and crossfeed movements, make any precision grinding job a fast one on the Abrasive No. 1½.

The many one-of-a-kind jobs which can tie up your toolroom are easily handled by Abrasive No. 1½. Your proof of this grinder's versatility can be seen in the thousands of shops where this grinder is producing at least 25 jobs a day.

Standard equipment — 1 H.P. motorized spindle. Available with 2 H.P. spindle at slightly increased price.

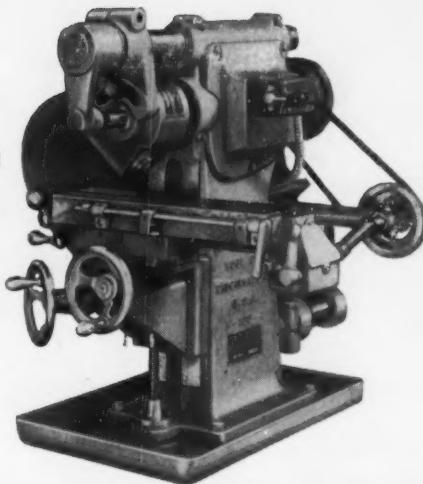
For complete specifications, send for Abrasive No. 1½ Catalog. Abrasive Machine Tool Company, 20 Dunellen Road, East Providence 14, R. I.



ABRASIVE QUALITY IS REFLECTED IN THE FINISH OF YOUR PRODUCT

BURKE BENCH MILLERS
...for most efficient
machining of small parts!

Here's the horizontal miller that combines unmatched accuracy and low cost! Two power feed tool room models and two hand feed production models permit rapid handling of a wide variety of small parts and freeing big millers for larger jobs. Numerous attachments and accessories provide even greater versatility and speed. Detailed literature on request.



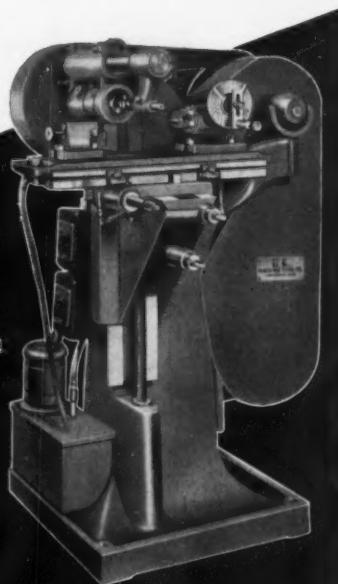
OUTSTANDING ACCURACY AT LOWEST COST

Find out how fast, accurate and economical small milling can be! U. S. Burke milling machines provide outstanding quality, dependability and convenience in operation . . . for hundreds of dollars less than leading competitors. Investigate U. S. Burke time and money-saving performance now! Write The U. S. Burke Machine Tool Division, 3 Brotherton Road, Cincinnati 27, Ohio

U. S. No. 1 HAND MILLING MACHINE
... half the cost, twice the value!

A top-quality precision production tool . . . priced so low it's actually profitable to spot it around "looking for work" that can be kept out of the milling section. Accurate, rigid, simple and adaptable. Easily equipped with air-hydraulic feeds for high production.

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THE **U • S • Burke** MACHINE TOOL DIVISION



Now—Lock Your Feed Rates to Protect Machines . . . Reduce Costs with the **CROSS** Flow Control Lock!

Only authorized personnel carry a key for the Cross Flow Control Lock! They set machine feed rate, then lock it.

Easy to install. Just remove valve nameplate and adjusting lever, re-install over lock mounting plate.

Available for Vickers $\frac{1}{4}$ " flow control valves and remote control panels.

For full details, write Dept. A-62.

- Eliminates Tampering
- Stops Costly Shutdowns
- Prevents Tool Abuse and Breakage
- Protects Machines Against Overloads
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Established 1898
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Why CIMCOOL wins by two ^{big} points . . .

First, because CIMCOOL[®]—the radically new and different cutting fluid—*lowers costs*. Second, this revolutionary coolant *does a better job*.

Naturally CIMCOOL takes home the trophy. It's a *chemical emulsion*. It replaces all water emulsions and all but a few highly compounded specialty oils. It permits faster speeds and increases tool life because it combines friction reduction and cooling capacity in a degree never before attained. It's longer lasting in machines, so CIMCOOL reduces downtime and cuts labor costs for cleaning and changing.

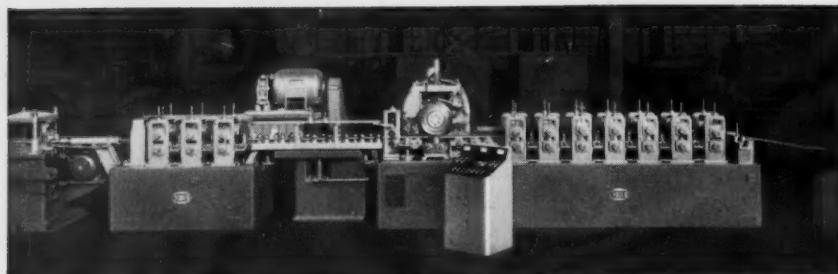
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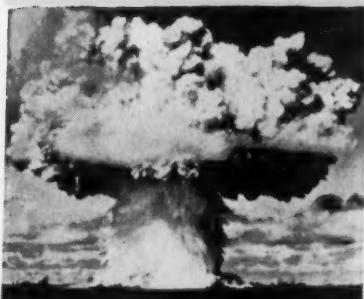
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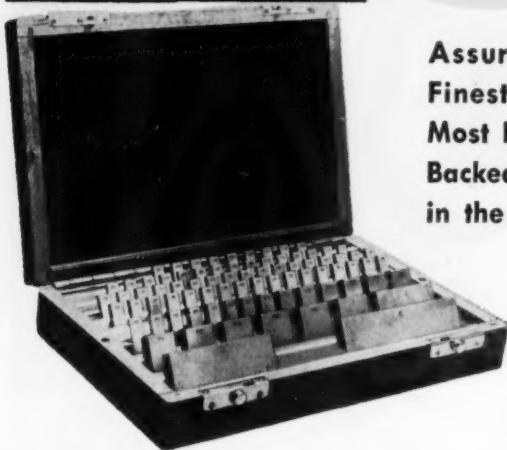
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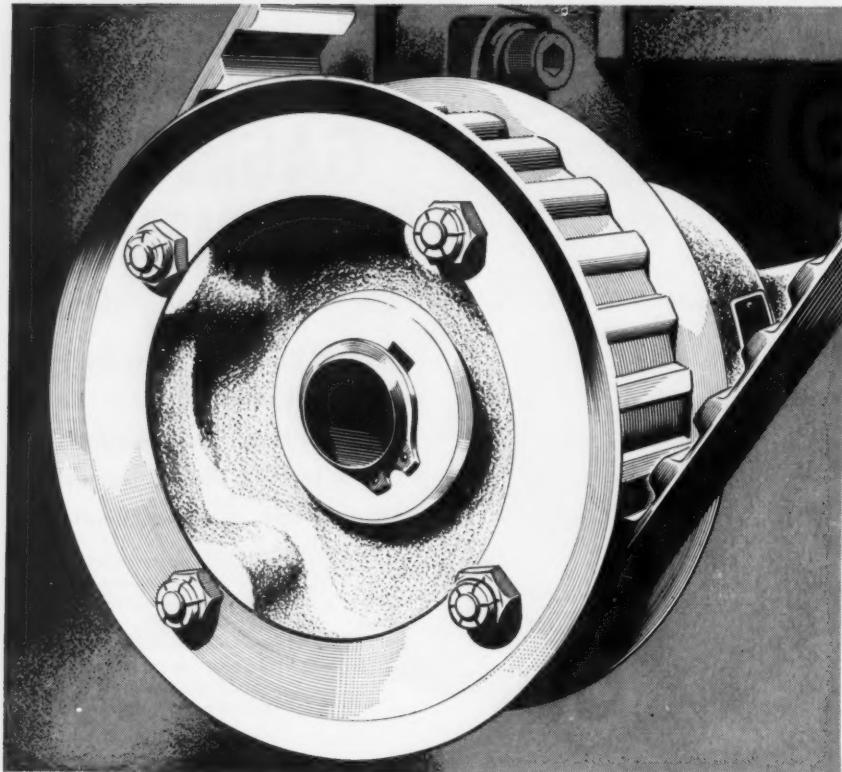
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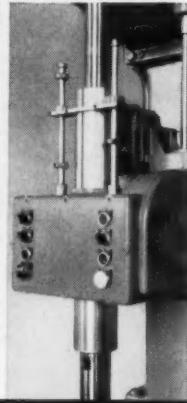
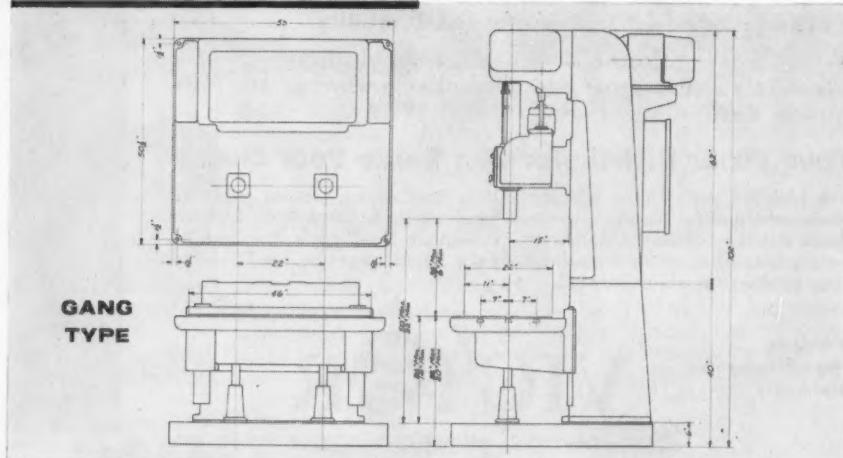
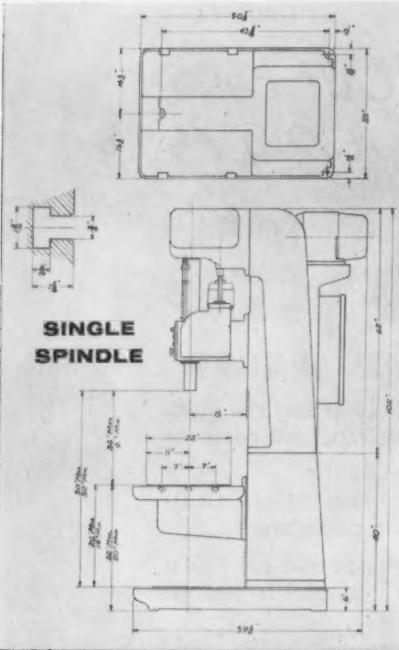
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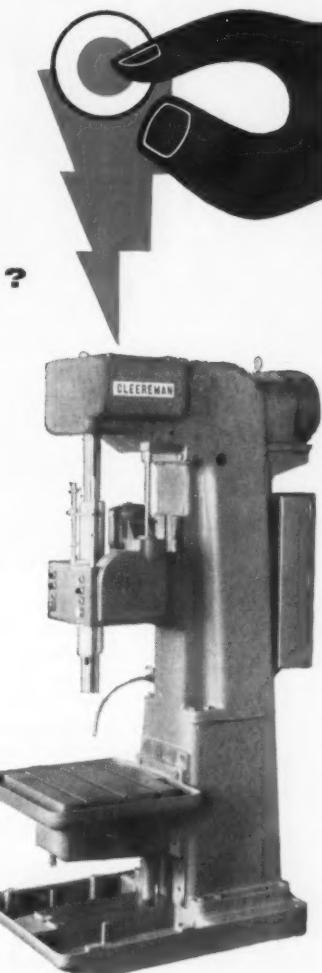
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BACKGROUND

Illumination is a subject that ordinarily might not get top billing in a metalworking magazine, but we think you will agree that it deserves the No. 1 spot after you have read Bob Gasker's story beginning on page 116. When Bob, who incidentally holds the title of Illuminating Engineer at General Electric's Lamp Division, Nela Park, Cleveland, wrote us a month or so ago, he said, "From the many hundreds of letters received annually in our Inquiry Bureau, we know there is a tremendous amount of interest in the subject of lighting for virtually every kind of business — from the Mom-and-Pop type delicatessen, to department stores, manufacturing plants, and machine shops.

"There is one common motive — that of learning how increased sales or efficiency can widen the ever narrowing gap between cost of operation and profit. Our application engineers here at Nela Park, and in

the field, do their best to answer individual requests for information. We know, however, that there are many thousands of others who are *in the dark* on how proper lighting may be the difference between profit and loss in their particular operation."

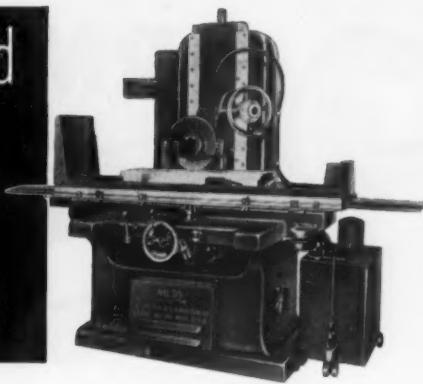
If you have any questions after reading the article, please don't hesitate to write us. We'll do our best to find the answers for you.

★ ★ ★

GAGING

If you overlooked C. W. Kennedy's article in the January issue, you've missed the start of the finest bit of writing on the subject of gaging we've ever seen. Number two of this three-part series begins on page 174 of this issue—just past the center spread. To get the most from the series, you'll want to read all three in order of appearance, last issue, this issue, and next issue.

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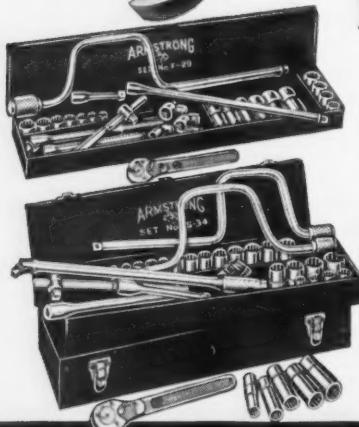
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MODERN Machine Shop

Vol. 27, No. 9
FEBRUARY, 1955

features
in this issue



THE LIGHTING SYSTEM IN YOUR SHOP • By Morgan Christensen

In this article, the importance of proper machine lighting is stressed and the changes that have been made in this field are discussed.

Page 116.

MASS INSPECTION WITH SURFACE PENETRANT • By Gilbert C. Close

This article discusses the new Northrop Aircraft setup for large-scale mass inspection of production line parts using a surface penetrant inspection technique. Page 124.

TV TOWER LEGS ARE SHOP WELDED FOR EASY FIELD BOLTING

Techniques used in welding television towers of the triangular guyed type are described in this article. Page 130.

SALVAGING TURBINE GUIDE BEARING SLEEVES • By Lloyd McWilliams

The author discusses a method of repairing worn sleeves by welding preformed stainless shells to the carbon steel sleeves. Page 136.

MACHINING STAINLESS STEEL • By G. J. Stevens

Poor carbide tool performance on a small Type 302 stainless steel casting was the problem in this case history, to which a simple solution was found. Page 140.

FOREMAN'S DUTIES IN TIME OF AN EMERGENCY • By Alfred M. Cooper

The discussion concerns the foreman's emergency supervision in any possible future period of total warfare, the necessity for maintaining excellent morale under difficult conditions and for carefully conserving our skilled manpower in such a period of extreme emergency. Page 146.

ESSENTIALS IN GOOD GAGE PRACTICE, PART II • By C. W. Kennedy

Additional basic conditions with which a gagemaker contends and other fundamentals he considers in correct design are treated in this installment. Page 174.

The Lighting System In Your Shop

The importance of proper machine shop lighting is stressed and the changes that have been made in this field are discussed.

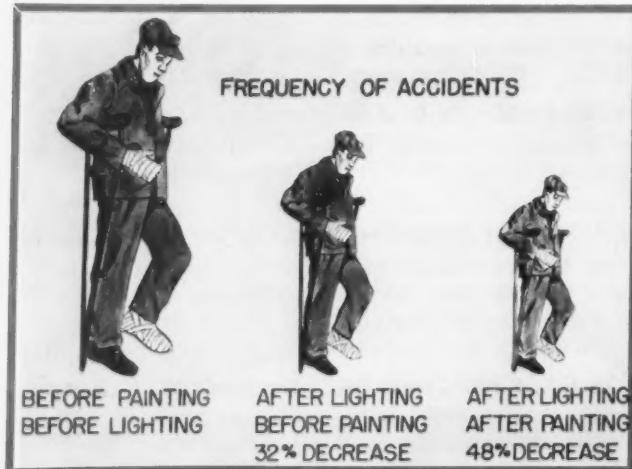
By MORGAN CHRISTENSEN*

As Told To
BOB GASKER

HAVING recently celebrated the seventy-fifth anniversary of Thomas A. Edison's discovery of the first practical incandescent lamp, it seems to be particularly appropriate to review briefly the changes that have been made in machine shop

lighting and to see just how far we have progressed in this field. Do you remember the "good old days" when shops were lighted by bare lamps hung from cords attached to the ceiling? In those days too, shops were painted in dark and sombre colors or else not painted at all. Floors were oiled and reoiled until they were nearly black with an accumulation of dust and dirt. Windows were used extensively for light; but

* Illuminating Engineer, Lamp Division, General Electric Co., Nela Park.



This record speaks well of the part played by lighting in reducing accidents. Increasing the lighting level from 5 to 20 footcandles in an erection shop gave these results. Note also that painting plays an important role.



The 750-watt R-52 reflector lamps in areas with heavy dirt conditions such as shown in this illustration reduce maintenance and provide for more uniform illumination throughout their life.

they were often sources of glare during the day and appeared as black walls during the hours of darkness.

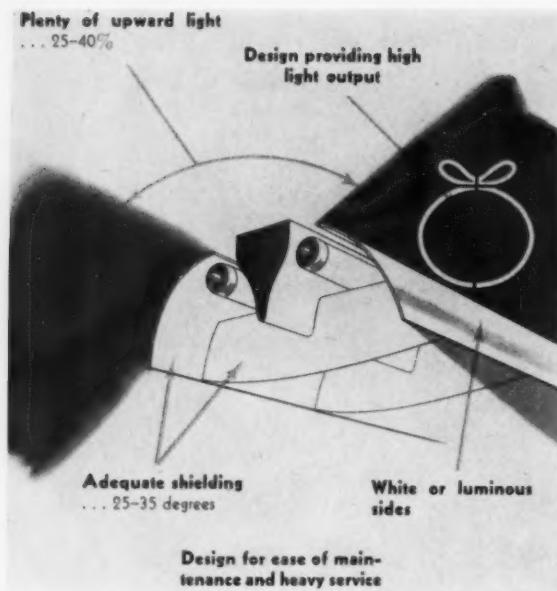
Today, all of that is changing. Management has come to realize that a pleasant working environment is just as important (if not more so) for the skilled shop worker as it is for the office worker. So the trend in industry is toward the use of lighter color schemes and well shielded fluorescent lighting equipment with a substantial amount of upward light. This creates pleasant, more comfortable seeing conditions by making the brightness of the surrounding surfaces more nearly uniform. Why has management been constantly improving the lighting in the work areas? Basically, because of

the many benefits that good lighting offers.

1. Good lighting means increased production by helping workers see faster and more easily. The production of small parts increased 15 per cent in the pattern shop of a machine tool company when the lighting was improved. In another instance, illumination was substantially increased and production jumped 25 per cent for a piston ring manufacturer.

2. Well designed lighting can reduce rejects and spoilage. Rejects dropped from 17 to 9 per cent when the average illumination in a machine shop was increased from 15 to 75 footcandles.

3. Good lighting also reduces costs by helping to cut down accidents. One company increased its



Widespread use of this new type industrial lighting fixture means increased seeing comfort for workers.

and there are no dark corners to collect trash.

6. A well designed lighting system can help to improve employee morale by creating a pleasant working environment. Workers are more cooperative; and the job of supervision is easier and more pleasant.

The goal of an effective visual environment in any shop to

provide a sufficient amount of light for easy seeing and to control brightness to assure conditions which will provide visual comfort for workers. Lighting should be considered from two standpoints — the quantity of light and the quality of the lighting.

The quantity of light for any specific seeing task in any shop is based upon a compromise between what would be ideal and what can be obtained practically and economically with light sources and equipments as we know them today. In general, illuminating engineers recommend higher levels of lighting for those areas where the seeing task is hardest and lower levels where seeing requirements are less critical. One of the factors contributing to today's higher lighting levels is the increase in lamp value over the

lighting level from 5 to 20 footcandles in its machine shops and reduced accidents by 32 per cent. By combining repainting with relighting accidents were cut another 11 per cent, for a total reduction of 43 per cent.

4. Good lighting helps keep older, experienced men productive. By the age of 60, it is estimated that 70 per cent or more people suffer from defective vision. Good lighting cannot correct defective eyesight. It can, however, help preserve the workers' eyesight, enable those with defective vision to see better, and so aid in keeping the experienced worker productive.

5. Better housekeeping also results when a good general lighting system is installed. The well lighted area has a neat, clean appearance

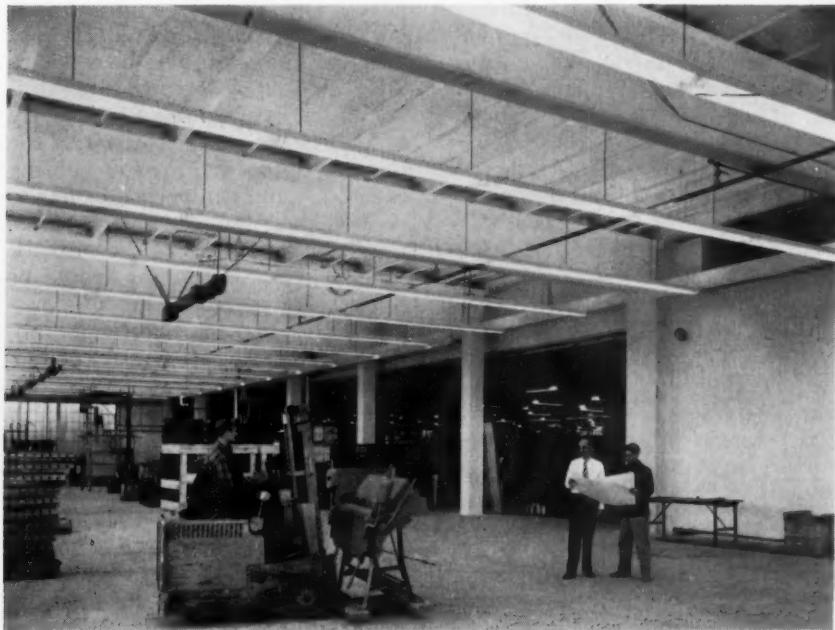
years. For example, comparing the present fluorescent lamps with those manufactured in 1939, the price of today's lamps is down two-thirds, their efficiency has been increased by one half, and their life is five times greater. Lamps designed for specific applications, such as reflectorized lamps for use in areas with heavy dirt conditions, are also contributing to better lighting. Further advances in light sources, fixtures, and distribution systems will enable us to have still higher levels of illumination with comfort in the future.

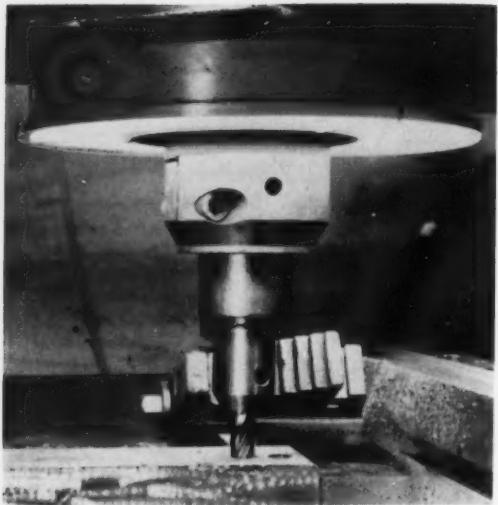
Lighting levels can be increased by simply adding more fixtures; however, in order to obtain these

high levels with comfort careful consideration should be given to the type of fixture, layout of lighting system, and treatment of room and machine surfaces.

Light-robbing surfaces are giving way to light-reflecting ones which reflect light back into the room and help to produce comfortable brightness relationships. Laboratory and field investigations have shown, for example, that seeing conditions are improved by proper control of brightness ratios between the work and the surroundings. This is one of the reasons why lighter finishes are being used in shops today. They help to insure a proper balance of

There is a difference! New type industrial lighting compared with the old type at approximately the same level of illumination (50 footcandles in the old area vs. 70 footcandles in the new).





This permanently positioned cirlcline supplementary lighting unit provides additional light where needed.

brightness between the working surface and the surrounding environment. Incidentally, more useful light is also redirected back into the room.

Workers lift their eyes from their work in order to rest them by looking at some distant object. If the surroundings are dark, workers' eyes must adapt to this darkness and then readapt to the brightness of the work when they return to the task. This seeing condition leads to unnecessary fatigue.

New types of industrial lighting fixtures, such as shown in one of the accompanying illustrations greatly improve this situation. The openings in the top allow light to go up and brighten the ceiling. This lowers the brightness contrast between the ceiling and the bright sections of the lighting fixtures, thus giving a more comfortable seeing environment. Much of the light on the ceiling is reflected back to the work surfaces, so it is not wasted but used

more effectively. This type of fixture is also more efficient because light that was previously trapped between the lamps and upper part of the reflector now is allowed to escape and better ventilation permits the lamps to operate at a lower temperature, thus raising their light output. The ventilating action carries much of the dust and dirt through the fixture instead of depositing it on the reflector, which means that the reflectors will stay clearer longer. The lamps are well shielded to reduce direct glare.

Direct glare can also be substantially reduced by the proper orientation of the fixtures. In an area where all of the workers are facing in the same direction, the rows of lighting fixtures should run perpendicular to the workers' line of vision. If the rows must be run along the workers' line of vision, the lamps should be shielded by the addition of cross-wise louvers in the fixtures.

Windows are often sources of glare. One way to eliminate this glare is to paint them—preferably with light colored paint which will reflect light back into the area. If it is necessary for workers to look out, a small vision strip can be left unpainted. Of course, venetian blinds, shades, awnings, or shutters can also be used to help eliminate this window glare.

Experience has shown that the major cause of seeing complaints in shops has been due to an over emphasis on local lighting at the expense of a good general lighting system. The need for an adequate general lighting system cannot be too highly stressed. This general lighting system must be provided to (1) illuminate the work; (2) illuminate the surroundings; (3) reduce shadows to a minimum; and (4) reduce reflected glare. The general lighting system should provide enough light for the efficient performance of any type work prevailing in any one area. Table I is a recommended guide which has been worked out by illuminating engineers to fit most industries. Remember, however, that these recommended levels of illumination are for the general lighting systems and supplemental lighting may also be needed.

When a good general lighting system is installed to replace an existing local lighting system, with a unit over each machine, annoying shadows are reduced to a minimum. With the new system the light comes to the point of work from many directions instead of from just one.

The lighting system in your plant needs proper attention if the workers are to receive the maximum benefit from it. Cooperate with the maintenance people.

As a general lighting system is a large area light source supplying light from many directions, reflected glare is reduced as much as possible and more comfortable seeing results.

A good general lighting system has another important advantage in that the layout of machines can be changed at any time without changing the lighting system. Thus, it is much easier to make the most efficient use of the floor space.

Supplemental lighting may be needed to handle special lighting problems. The type of supplemental lighting that should be used depends upon the job that is to be done. It is desirable that supplemental lighting units be permanently positioned to discourage adjustment by work-



TABLE I.—Recommended Levels of General Illumination

Minimum Footcandles in Service (On Task or 30 inches above Floor)		Minimum Footcandles in Service (On Task or 30 inches above Floor)			
MOST DIFFICULT SEEING TASKS					
ORDINARY SEEING TASKS					
Fine Precision Work	Involving Fine Detail	100 ft-c	Normal Contrast		
Poor Contrasts		or more	Intermittent Periods of Time		
such as	Long Periods of Time	such as	Automatic Machine Operation, Rough		
	Extra-fine Assembly, Precision Grading		Grading, Continuous Processes,		
	Extra-fine Finishing		Conference and File Rooms,		
			Reception Rooms		
VERY DIFFICULT SEEING TASKS					
Precision Work	Involving Fine Detail	100 ft-c	such as		
Fair Contrasts			Hallways, Corridors, Passageways,		
Long Periods of Time			Storage, Stairways, Washrooms		
such as	Fine Assembly, High-Speed Work				
	Fine Finishing				
DIFFICULT AND CRITICAL SEEING TASKS					
Prolonged Work	Involving Fine Detail	50 ft-c	10 ft-c		
Moderate Contrasts					
Long Periods of Time					
such as	Ordinary Bench Work and Assembly,				
	Machine Shop Work, Finishing of				
	Medium-to-Fine Parts, Office Work,				
	Garage Work Areas, Switchboards				
ROUGH SEEING TASKS					

ers. These units should light the work without producing glare that would interfere with the worker's vision. Supplemental lighting can be used for those tasks that require a higher level of illumination than the amount that can be economically provided by the general lighting system. This lighting should not be used alone, but in conjunction with the general lighting system.

But a good lighting system can't be installed and then forgotten; it needs attention just as any other tool

of production in order for you to obtain the most benefit from it. So cooperate with the maintenance people and their planned lighting maintenance program. It was designed to help you.



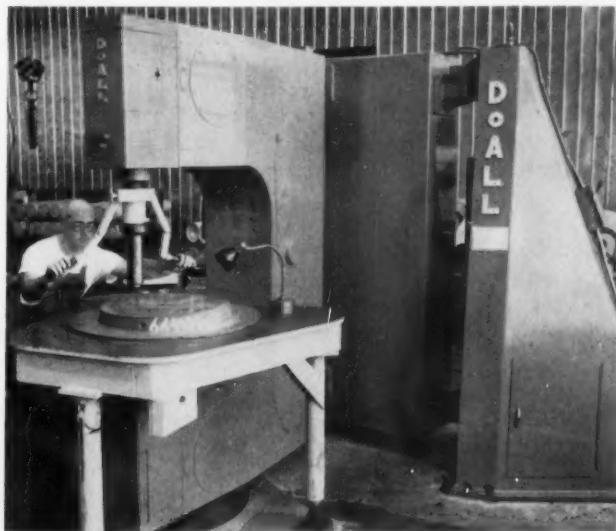
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World's Largest Die Filing Machine

INSTALLED in the Alcoa plant in Lafayette, Indiana, the huge die filing machine shown herewith, built by The DoAll Company, Des Plaines, Ill., and described as the world's largest die filer, is used to file intricate openings in extrusion dies weighing up to ten tons which are utilized for extruding large channels, rails, sills, spars, beams and stressed skin sections of aluminum in a wide variety of forms and shapes. After the extrusion dies have been machined on a

band saw, the die aperture is finished on the die filer by directing the file against the die; the die remains stationary on the work table. The entire filing head of the machine can be readily swung by the operator to direct the file against the die.



Mass Inspection With Surface Penetrant

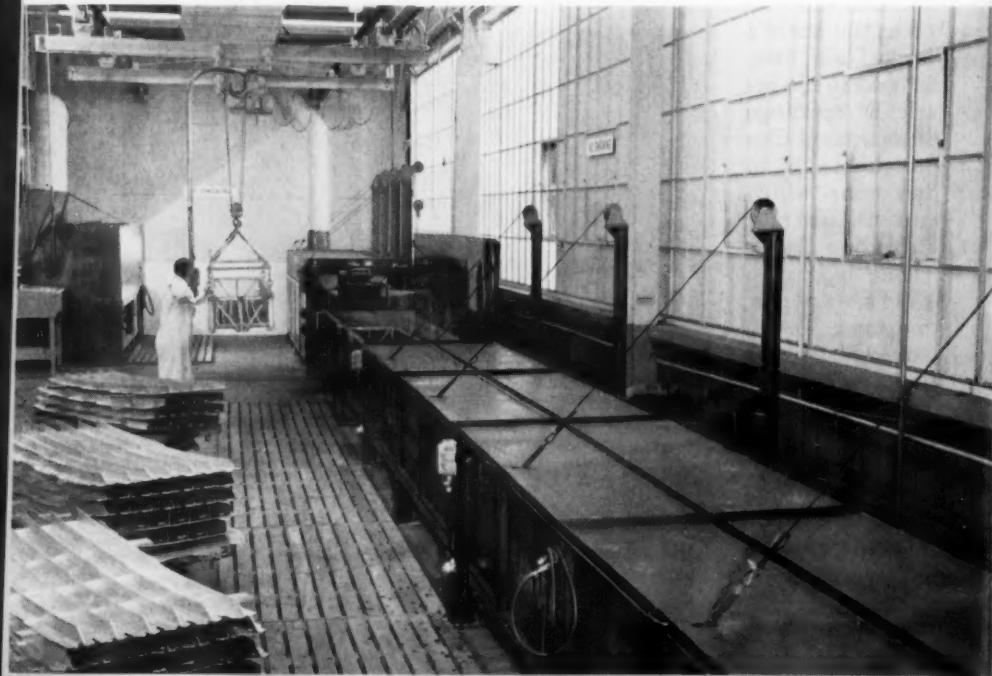
By GILBERT C. CLOSE

This article discusses the new Northrop setup for large-scale mass inspection of production line parts using a surface penetrant inspection technique.

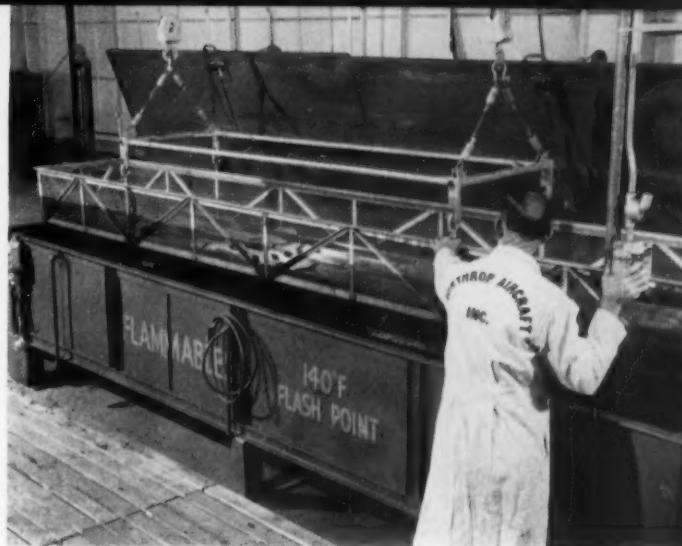
LARGE facilities for the mass inspection of production-line parts using a surface penetrant inspection technique were installed recently at

Northrop Aircraft, Inc., Hawthorne, California. These facilities consist of a series of large tanks in which the parts are dipped, drained, and rinsed.

General view of the new Northrop Aircraft dye penetrant surface inspection department. Solution and rinse tanks are in right foreground; drying oven is at rear. Spray booth for application of the "developer" coating is at far left.



A basket of parts is shown being lowered into the dye penetrant tank. Immersion time is about 15 minutes, followed by a good drain. Sufficient time must be allowed for the dye to penetrate into the finest surface cracks and other irregularities.



ed; a drying oven for drying the parts quickly after rinsing; and an air-vented spray booth for application of the developer coating.

Approximately 100 ft. long x 30 ft. wide and equipped with an overhead traveling crane for work handling, this new department allows for the surface inspection of magnesium and aluminum aircraft parts in numbers hitherto not possible at Northrop. Dy-Chek is used as the inspecting medium. In this process, the parts are first dipped in a brilliant red dye solution which penetrates into any surface defects. Next, the dye clinging to the surface of the metal is softened in a solvent and then rinsed away with water. However, any dye that has penetrated into the surface defects is not removed by this rinsing.

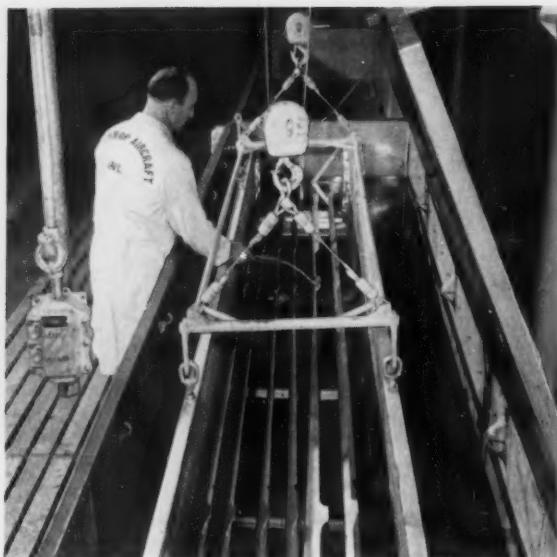
Next, after oven drying, a thin developer coating which dries chalk-white is applied to the parts. This developer coating has very strong capillary attraction for the dye penetrant and withdraws it from any surface defects into which it has penetrated. The withdrawn dye then forms a brilliant red pattern of the

underlying defect on the chalk-white surface of the developer coating.

While Dy-Chek has been used extensively for several years in spot-checking production parts, and for many maintenance inspection jobs, the new Northrop setup is said to be its first large-scale mass inspection application. In the new Northrop department, three 4-foot by 16-foot tanks are employed. The first tank contains about 800 gallons of the dye penetrant. The second tank contains about the same amount of solvent for softening the dye that clings to the surface of the metal. The third tank serves as a drain for the hand-manipulated cold water rinse nozzle used to wash the softened dye from the surface of the parts.

Work is handled through the tanks in baskets ranging upward to maximum tank size. The baskets are handled by an overhead traveling crane.

All work must be thoroughly cleaned prior to inspection. This is accomplished by degreasing and by

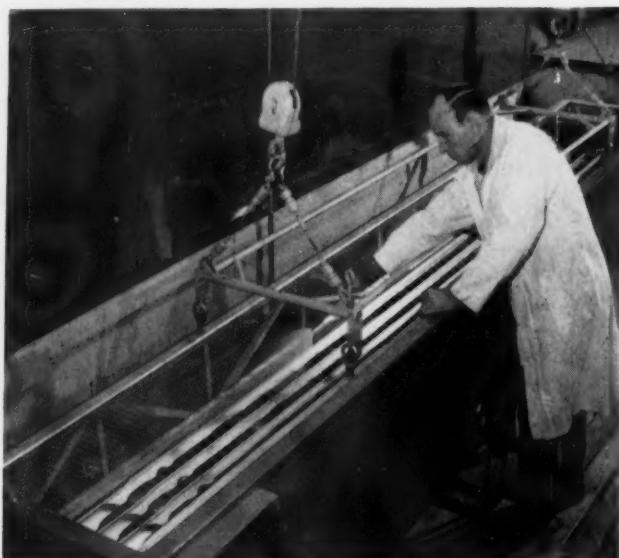


In this view a basket of airplane spar caps is shown in the solvent tank where dye clinging to the surface of the metal is softened so that it will rinse away. A low-pressure hand nozzle is available to flow the solvent over the work if necessary for complete coverage.

In the first step of the process, the basket-loaded work is immersed for about 15 minutes in the dye penetrant tank. A built-in sump pump keeps the solution in constant circulation. The work is then raised above the surface of the dye solution and

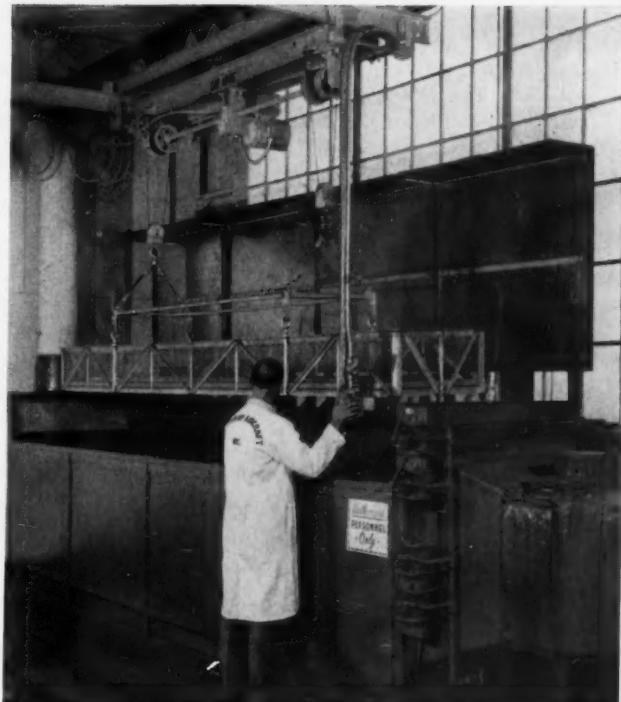
allowed to drain. Swinging cross members are provided in the dye penetrant tank on which the work

solution cleaning. When the work is loaded into the baskets, it is given a final visual inspection and any remaining dirt is removed by hand cleaning. Dirt remaining on the surface of the work may absorb enough dye penetrant to give rise to a false defect indication after application of the developer coating.



In this view the work has been transferred to the cold rinse tank. A high-pressure hand nozzle is used to flush the solvent-softened dye color from the surface of the work.

The work now enters the 20-foot drying oven for a quick dry prior to application of the developer coating. Note four-part air-actuated oven cover which permits insertion of small baskets without opening entire oven top.



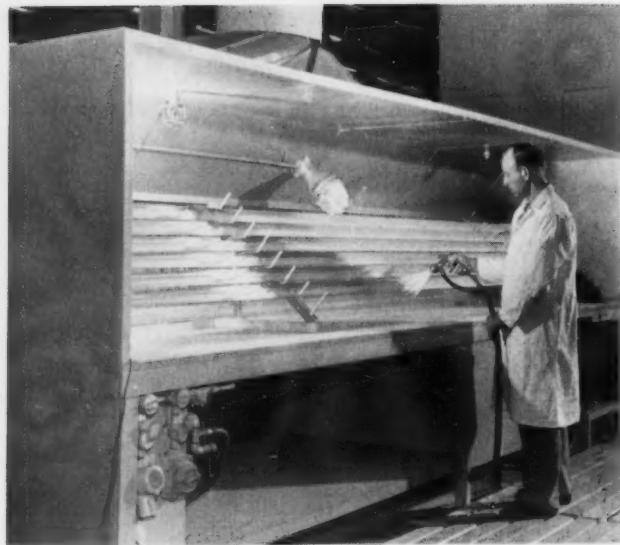
basket may rest during draining if the overhead crane is needed elsewhere at the time.

After draining, the work is transferred to the solvent tank. A quick dip in the solvent is enough to soften the dye penetrant clinging to the surface of the parts. Here again a five-minute drain time is allowed. The basketed parts are then transferred to the rinse tank where cold water from a hand-manipulated spray nozzle is used to wash away the softened dye penetrant, leaving the metal free of dye color.

After rinsing, the parts are placed in a top-opening drying oven operated at 150 degrees F. Drying time is approximately 15 minutes. This drying oven is equipped with a four-part air-operated cover which makes it unnecessary to open the entire top when only a small basket of parts is inserted. A blower and electric coil are used to maintain oven temperature. The oven covers are provided

with a safety device to prevent them from accidentally slamming down upon the operator in the event of a compressed air failure.

After the parts are removed from the drying oven, they go directly into a spray booth for application of the developer coating. This booth is equipped with a forced-air exhaust system to control developer overspray. The developer coating is applied with an ordinary paint spray gun using about 20 p.s.i. tank pressure. This coating dries almost instantly, and the parts may be inspected immediately after spraying. After inspection, the developer coating is washed away in a large spray



Spraying the spar caps with developer coating in the 20-foot forced air exhausted spray booth. Developer coating dries almost instantly, thus permitting immediate inspection. An ordinary paint spray gun is used at 20 p.s.i. tank pressure to apply the developer coating.

rinse facility located in another production department.

The magnesium and aluminum parts being inspected in the new facility range all the way from large spar caps down to small joggled fittings. Such common defects as laps, inclusions, cracks, and excess porosity are easily detected by the Dy-Chek process. The pattern of the defect stands out in brilliant red against the chalk-white developer coating. False indications are rare, and usually limited to cases where the part was not properly clean prior to inspection.

Replenishment of the tanks is by outright additions of the proper solution as required. Neither the dye solution nor the solvent solution deteriorates with use. Northrop engineers point out, however, that the solvent solution may have to be changed when it becomes so thor-

oughly contaminated with dye that it tends to leave a reddish discoloration on the metal.

As the two solutions employed are highly inflammable with a flashpoint of about 140 degrees F., utmost precautions against fire hazards have to be employed. Two large valves permit almost instantaneous emptying of the tanks in case of fire. Both the dye penetrant and solvent tanks contain low-melt fuses which, upon contact with heat nearing the flashpoint of the solution, melt and actuate a tank cover closing mechanism. Auxiliary fire-fighting equipment in the form of CO₂ cylinders is located throughout the department.

The new Northrop surface inspection department is planned to operate two full shifts and absorb a major portion of the inspection work on critical light metal parts. It is a far cry from the "paint brush" application of the Dy-Chek solutions commonly used up until this time. Industrial engineers from many other companies where use of the surface

penetrant inspection technique seems feasible have been flocking to Northrop to inspect the new installation. The tanks, oven, and spray booth are all Northrop-designed.

* * *

Precision Metal Forming Film

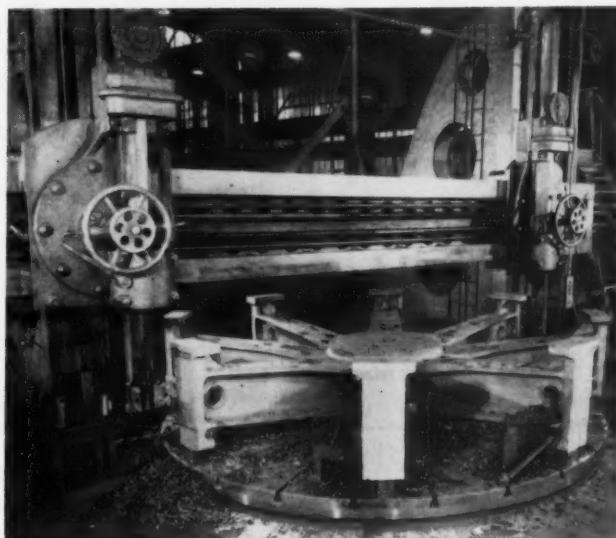
A COLOR movie, entitled "Precision Metal Forming," is available to all groups interested in a process of metal forming which is rapidly becoming accepted as one of the most up-to-date means of producing many aircraft, jet engine, guided missile and helicopter parts. The film traces the development of the radial draw former, a machine which combines

the principles of rotary stretch and rotary compression forming, and shows how the latest model, equipped with a traversing compression unit which "irons" the part being formed against the die, is used to produce rings, arcs, long sweeping curves, angle changing and multi-plane parts in stainless steels and high tensile aluminums, as well as other modern metals. The formation of joggles, reverse bends and large sheet parts is also demonstrated. The film is concluded by a glimpse of the giant metal forming machines used in the process. The movie, which requires a running time of 31 minutes, is available from The Cyril Bath Co., 32326 Aurora Rd., Solon, Ohio.

* * * * *

Milling 16,000-Pound 170 Inch Diameter Turbogenerator Spider

THE accompanying illustration shows a 16,000-lb. 170-inch diameter spider for a turbogenerator being rough milled for an electrical manufacturer on a vertical boring mill at the Union Steel Castings Division of the Blaw-Knox Company, Pittsburgh. The 14-foot table accommodates castings up to 304-in. diameter.



TV Tower Legs Are Shop Welded For Easy Field Bolting

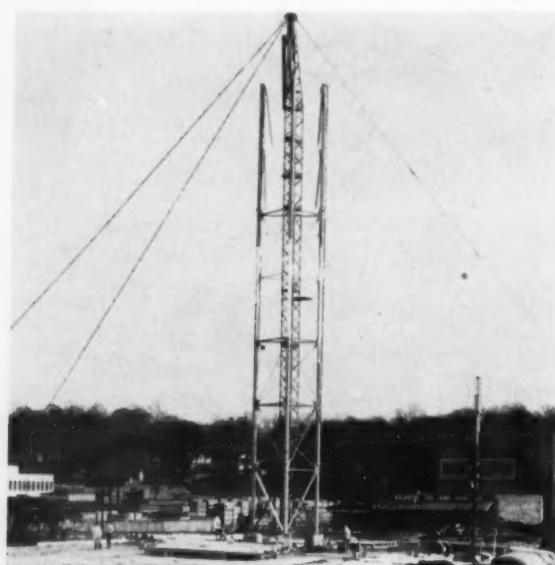
This article describes techniques used in welding television towers of the triangular guyed type.

NOVEL combination of shop arc welding and field assembly by bolting is being used to advantage in building high TV towers of the triangular guyed type. They are steadily being designed heavier and taller, one of the latest being a 1572-foot giant weighing 660 tons for

Station KWTV of Oklahoma City, Oklahoma. Several other TV towers over 1000 feet in height have been erected—at WBEN-TV in Buffalo, at WSB-TV in Atlanta, at WTMJ in Milwaukee and at WJBK in Detroit.

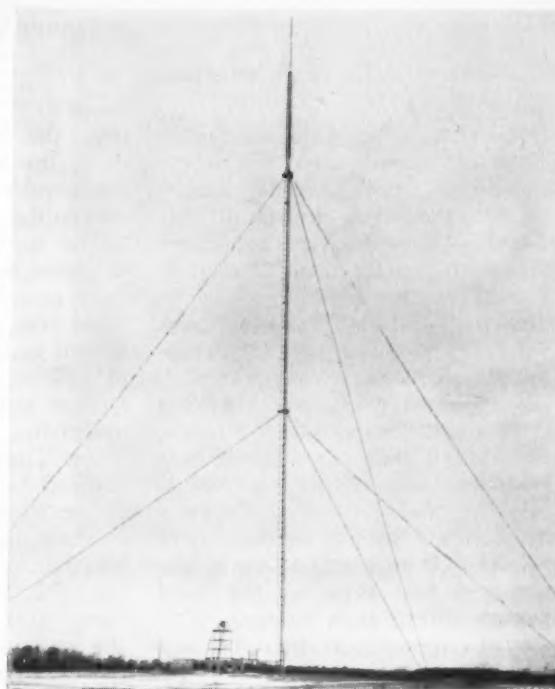
Welding is used to fabricate sections of the three vertical legs which require attachment of end flanges and intermediate wing plates to which horizontal girts and diagonal bracing are bolted in the field. Leg members are bolted together through the end flanges.

After welding, the various elements are



Start of construction on a high triangular guyed TV tower showing how crane boom in center is used to lift leg sections, girts and diagonal bracing into place for bolting to shop welded wing plates and flanges on the legs. As the tower goes up, so does the lifting boom.

Two sets of guy cables are used to brace this straight-sided 1057-foot triangular tower for WBEN-TV at Buffalo. It is a "baby" alongside more recent towers which have climbed to 1572 feet and are supported by four sets of double guys.



hot dip galvanized, paint primed and shipped to the erection site knocked-down. Erectors then hoist them piece by piece into place and bolt the sections together. As the tower increases in height, guy cables are fastened to weldments on the legs and anchored to suitable reinforced concrete bases on the ground several hundred feet from the tower base.

Specializing in the design and erection of such towers, as well as non-guyed pyramidal type towers, is the Ideco Division of Dresser-Stacey Company, Columbus, Ohio, which has set up a "tower shop" for exclusive operation on these jobs. Thus far, literally thousands of tons of steel and thousands of pounds of welding electrode have been consumed in a variety of tower work. On a most recent job, for example, the tower structure at Oklahoma City called for 660 tons of steel framing and over 11,000 pounds of welding rod. Steel sections included 30-foot lengths of solid steel rounds ranging from 4 to 10½ inches in diameter and 14-inch wide flange H-beams

weighing 314 pounds to the foot.

Leg sections of the towers are solid steel rounds ranging, as mentioned, up to 10½ inches in diameter and varying from 10 to 30 feet in length. They are positioned in jigs and the heavy circular end flanges and rectangular wing plates are tack welded into place accurately with the aid of fixtures on the jigs. The flanges are flame cut from plate or slab stock and may range up to 3½ inches thick. Wing and gusset plates are shaped similarly and some are as thick as 1½ inches.

The tack welded assembly is transferred by crane to another jig, powered to rotate the leg for welding the flange joints in the downhand

**"The typical 1000-foot TV tower will have over
200 tons of steel in its structure . . ."**

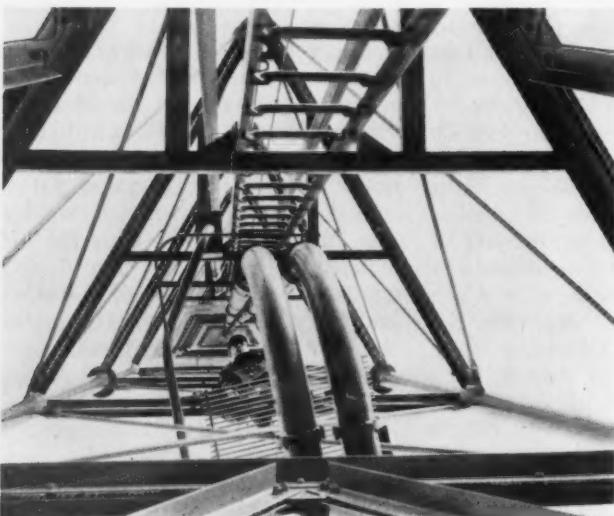
position and to bring the wing plate joints into proper angle for down-hand work. On the heavier flanges and legs, the former are counterbored and double welded inside and out to prevent the leg from "punching through" the flange after erection as a result of the high axial compression loads resulting from the exceptionally high dead weight of steel.

Weight and wind factors subject these towers to inordinate stresses, some design loads running well over 500,000 pounds. At numerous points the welds and, of course, the tower members are subject to reversal of stresses — from compression to tension and vice versa as the wind changes direction or strength. This is most noticeable in the upper sections and it is the practice to rein-

force the flange welds by backing them up with triangular gusset plates welded all around to the flange and to the leg.

The typical 1000-foot TV tower will have well over 200 tons of steel in its structure with two or perhaps three sets of single guy cables attached to the legs and fanning out at 120-degree angles, possibly 900 feet or better each in length and weighing approximately 15 tons alone. They are of prestressed galvanized bridge strand cable, from $1\frac{1}{2}$ to 2 inches in diameter, with insulators interspersed along their lengths to avoid electrical losses from the tower antenna system. The tower also is fully insulated from the ground at its base with signal power transmitted to the antenna through coaxial cables running up through the center of the tower.

Designs must take into account wind loads of approximately 60 pounds per



Worm's-eye view inside the Buffalo tower, showing how girts and diagonals are bolted to wing plates welded to the solid steel round tower legs. The parallel "pipes" are coaxial cables carrying the signal to the antenna 1000 feet up.

Wing plates and flanges are first tack welded to the legs and then the joints are continuously welded with a $\frac{1}{4}$ -inch fillet. High current setting and the drag type electrode combine to provide welding speeds on the order of 15 inches per minute.

square foot of projected area on the upper half of the tower, tapering down to around 40 pounds per square foot on the lower half. These loads are figured on the basis of flat structural sections, and the use of round legs and bracing permits their reduction by one-third in designing. Along the Atlantic Coast in the Florida hurricane area and also in the Pacific Northwest, towers are figured for wind pressures ranging up to 70 pounds per square foot. Ice loads for towers in northern areas of the United States range from $\frac{1}{2}$ inch to 2 inches.

In general, the diameter of the



round leg members decreases with increasing tower height, although such decrease does not occur uniformly. In one design, for example, the base sections had 6½-inch legs, increasing to 7 inches just above where the tower was subject to deflections from wind pressure, and then decreasing to 6¾ inches a little bit higher where guy cables are attached since there is no de-



Tower legs are spliced by bolts through mating flanges on the legs. Here a flange 3½ inches thick is being welded to a 7-inch round leg with fillet welds both inside and outside, requiring multiple passes. Lincoln Electric's high speed Jetweld I electrode and alternating current at about 275 amperes provide for fast metal deposition and a minimum of arc blow and spatter.

"A recent proposal for a 2000-foot design at Louisville, Kentucky, made the headlines."

flection encountered to guy points. The same type of general pattern is followed all the way up the tower with leg member size gradually decreasing as axial compression diminishes.

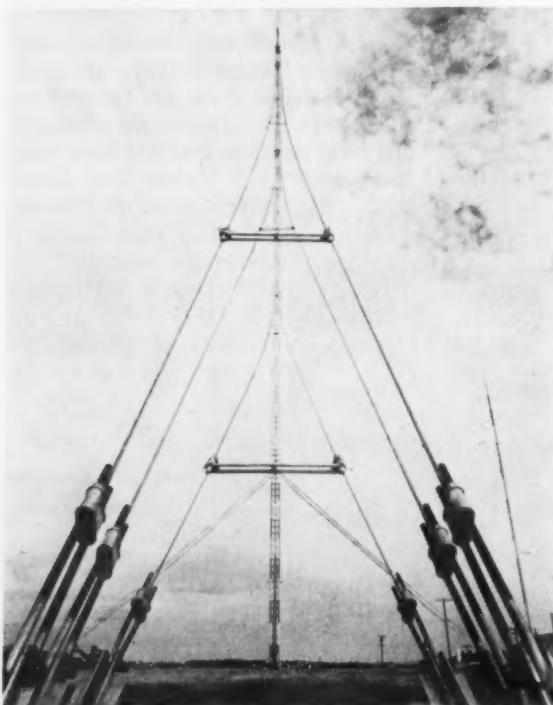
Tower legs are either mild steel (ASTM-A7) or low alloy high-strength steel. Girts, diagonals, gusset plates and flange plates are mild steel. Structural rib bolts are used to join all main girts and diagonal braces. Leg splices between flanges are standard machine bolts. All bolts

have either lock nuts or lock washers.

Tower sections are partially assembled on the ground (usually two legs and bracing) and then hoisted into position by a gin pole slung inside the triangular tower frame on cables. When the boom has reached the limit of its height, it is raised to a higher level for the purpose of hoisting succeeding sections into place.

Higher TV towers mean greater area coverage for the emanating signal since the accepted range is the line of sight to the horizon from the top of the television tower. Hence, the desire to build increasingly higher as competition for listeners' and viewers' attention becomes sharper. What the limit is, no one seems to know. A recent proposal for a 2000-foot design at Louisville, Kentucky, made the headlines.

The unique combination of prefabrication by welding in the shop and then bolting



View of the 1572-foot tower for Station KMTV, Oklahoma City, Oklahoma, which is said to be the tallest man-made structure in the world.

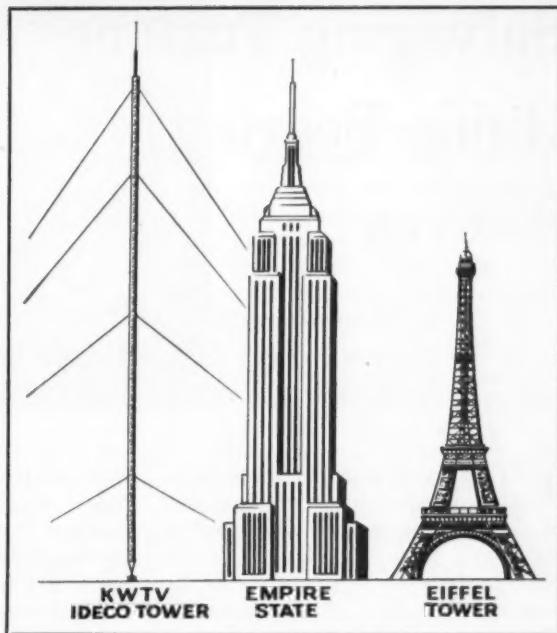
Sketch comparing height of Ideco-erected KWTW television tower with that of Empire State Building and Eiffel Tower.

together at the site has made an important contribution to the construction economy of successively higher towers.

The Ideco Division of Dresser-Stacey Company proudly claims it hasn't lost one to the elements yet!

(Illustrations courtesy
The Lincoln Electric
Company)

★ ★ ★



Die Casting Film

A 16-MM. color and sound motion picture which shows how to improve product design and at the same time reduce costs through extensive use of the die casting process is now available to industry and educational organizations from the American Zinc Institute, Inc., 60 E. 42nd St., New York 17, N. Y. Entitled "Die Casting — How Else Would You Make It?", the 35-minute film describes the advantageous application of this important production method. A comprehensive evaluation of zinc, aluminum, magnesium and copper base die casting alloys is presented in the film, outlining advantages and adaptability features of each. Detailed examination of 45 outstanding examples of parts die

cast of the various alloys points out the design flexibility of die casting in producing complex shapes within close dimensional limits.

A typical case history presentation follows a zinc die cast automotive radiator grille through casting, automatic buffing, polishing and plating operations. Successive steps of buffing and polishing, emulsion cleaning and spray rinsing, acid etching, copper flashing and build-up, nickel coating and final bright chromium plating illustrate how the excellent surface finish achieved in die casting facilitates the application of decorative and protective coatings. Latest design developments in die castings, as well as the most up-to-date production methods have been recorded in the film.

Salvaging Turbine Guide Bearing Sleeves

By LLOYD D. McWILLIAMS*

The author discusses a method of repairing worn sleeves by welding preformed stainless shells to the carbon steel sleeves.

THE function of guide bearings on the hydroelectric turbine is that of maintaining proper alignment of the shaft. The function of guide bearing sleeves—which fit inside the bearing—is that of absorbing the

wear which otherwise would take place on the shaft. Wear on the shafts is most undesirable; therefore, sleeves that can be replaced easily are employed. These are usually of the split variety.

Many turbines have guide bearings with running surfaces of lignum vitae, rubber and Ryertex—one of the new synthetic resinous materials. These types of bearings are water lubricated, and, due to the abrasives in most water, wear develops on the bearing liners and the guide sleeves. Wear may become appreciable five years after installation; therefore, it is good practice to examine guide bearings every five years and clean out ducts, water passages and piping.

When a turbine shaft starts to wobble or swing, it is evidence that wear is taking place. Spare bearings



Illustration showing a rather badly scored turbine guide bearing sleeve which was operating at the gland location.



Stainless steel shell ready to be welded to a carbon steel guide bearing sleeve.

are on hand at all stations, and, in the case of lignum vitae and Ryertex liners, they are frequently left undersize so that the bearing can be bored to fit the sleeves, which, of course, may also be worn. If found worn, but otherwise in good condition, the bearing is bored to accommodate the sleeves. Incidentally, there are a number of practices employed so that a quick change can be made to reduce down time. For instance, sleeves can be built up oversize to take a worn bearing. Later, a standard size bearing is installed and the sleeve again made standard. (Many maintenance men frown on the practice of getting away from standards as it will often lead to trouble and mix-ups.)

When guide sleeves become badly grooved, scored and develop flats, something must be done. Since a set of new sleeves represents an outlay

of several thousand dollars, any means of economically extending the usefulness of the sleeves should be considered.

Recently, a set of sleeves that required a face-lifting came into the shop. After some discussion it was decided to attempt an entirely new approach to the problem. Since stainless steel was considered to be the most suitable metal for such duty, it was proposed that preformed stainless shells be welded to the carbon steel sleeves. A previous job showed that to cast solid sleeves from stainless was somewhat costly; therefore, the decision was made to



Illustration showing the damage inflicted on the bearing liners when a sleeve fails.



Stainless steel shell in the process of being welded to a carbon steel guide bearing sleeve.

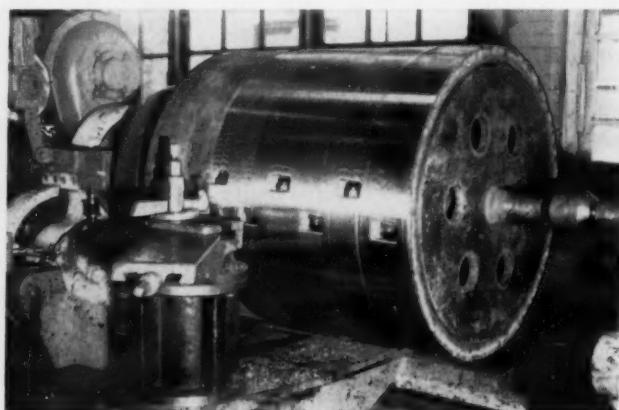
modate the stainless shells. This diameter will vary on different jobs and depends on the amount of wear on the sleeves. In this case $\frac{1}{4}$ -in. sheet was considered sufficiently thick to compensate for the wear and allow enough material for the finish machining and grinding.

After machining, the sleeves were removed from the lathe and split. The cylindrical shells were cut into halves and clamped firmly to each half sleeve. This operation was followed by spot welding. During the final welding stage, great care was taken not to set up excessive heat in any particular area since warpage might result. It was the welding that gave concern, as a look at the dimensions will indicate. These sleeves have an outside diameter of 32 in. and an inside diameter of 28 inches. They are 30 in. in length. They are also cored on the inside, and this

use preformed stainless shells which would weigh only a fraction of the total weight. A set of sleeves on some turbines weighs nearly 8,000 pounds.

Number CF-10-M (KSMO) $\frac{1}{4}$ -in. stainless sheet was obtained and rolled into cylindrical form, allowing some overlap.

The faulty sleeves were fastened to a mandrel, set up in a lathe and turned down to a predetermined diameter to accom-



After the shells are welded to the sleeves, the assembly is setup on a mandrel for machining, as shown herewith.

One of the half sleeves with its new armor plate of stainless steel after grinding.

added to our concern. However, no difficulty was experienced. All edges were welded, the idea being to keep water from entering into the space between the new shell and the sleeve. Incidentally, a liberal coat of red lead was applied to the sleeve before clamping the new shell into place.

Machining presented no difficulties; a Carbolyo tool was used for the job. Grinding, however, did offer one problem—that of expansion due to the heat set up by the grinding



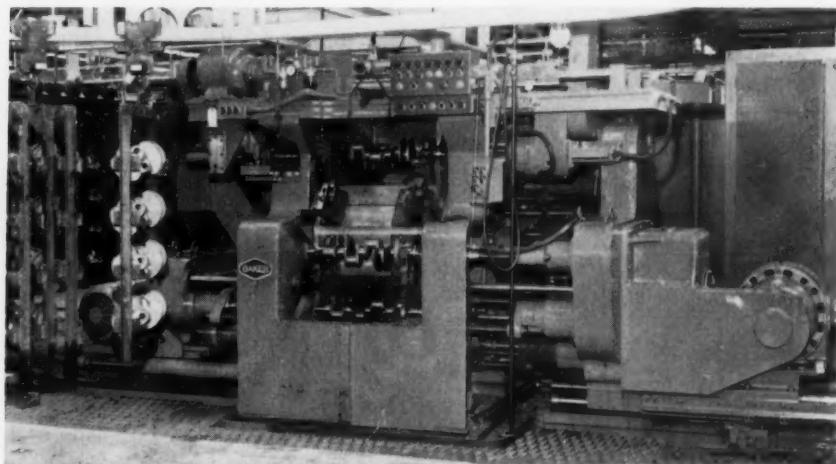
wheel. This was overcome by placing a large pan under the work and allowing the lower portion of the sleeve to rotate while immersed in water.

* * * * *

Special Purpose Drilling Machine for Crankshafts

THIS double-end trunnion-type machine, one of three special purpose machines manufactured by Baker Brothers, Inc., Toledo, for the Stu-

debaker-Packard Corporation, drills both ends of the crankshafts used in Packard's new V-8 motors. Machine cycle and index are automatic.



Machining Stainless Steel

By G. J. STEVENS*

Poor carbide tool performance on a small Type 302 stainless steel casting was the problem in this case history, to which a simple, yet effective, solution was found.

Problem: A small Type 302 stainless steel forging was being machined in a turret lathe with a carbide-tipped step tool. The operator complained of poor tool life and abnormal tool chatter. It was discovered that this condition was due principally to excessive tool overhang, as

illustrated in Fig. A of the sketch below.

Solution: To correct this condition and to shorten the tool, clamping members were reduced and the set screws countersunk in the clamps, as shown in Fig. B. This modification permitted the use of a shorter tool, lengthened tool life and decreased tool chatter.

* Machining Engineer, Armco Steel Corp.

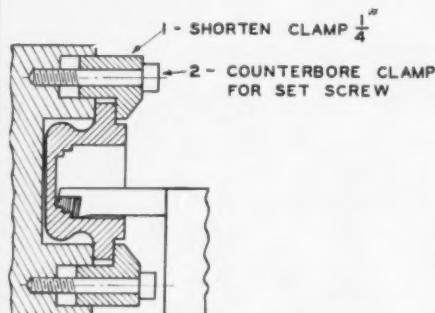


FIG. A.

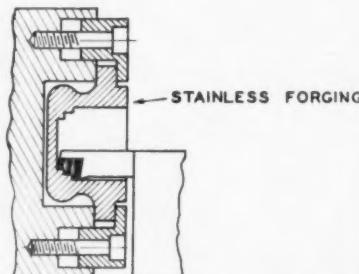
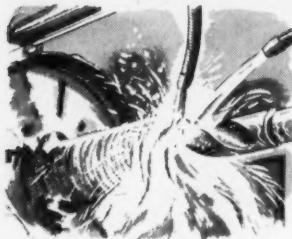
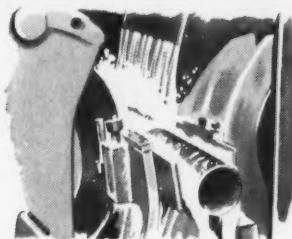


FIG. B.

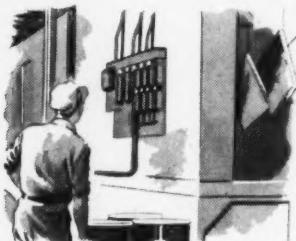
New S.E.C.O. is Tops For These Operations



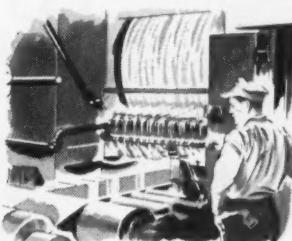
CUTTING WITH NEW S.E.C.O. Tools stay cool—require less frequent grinding. Finishes are uniformly good.



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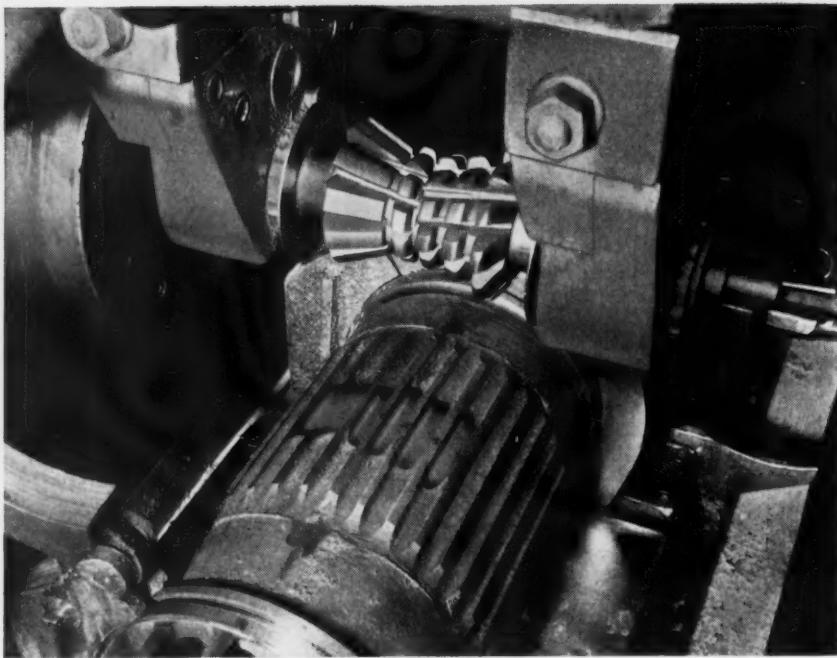
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BARBER-COLMAN FORM CUTTER DESIGN LESSENS CHATTER AND VIBRATION

Helical Teeth Provide Continuous Cutting Action

Shearing action of these Barber-Colman helical-fluted form cutters not only reduces chatter and vibration to a minimum, but also improves tool life and production on this milling job.

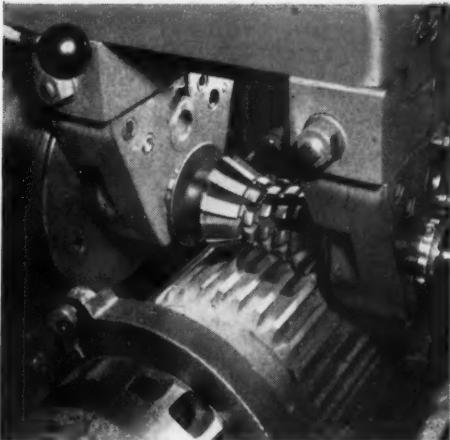
Gang-type cutters are recommended because they combine several operations in a single cut, and also because individual sections are interchangeable for other gang operations. Due to the type of cut and non-uniform material, some sections receive more wear than others and require more frequent replacement. With the gang arrangement, section replacements can be ordered singly, thereby reducing tooling costs.

Redesign of the cutters for this job included the adoption of helical teeth recommended by Barber-Colman Engineers. These helical teeth provide continuous cutting action and have eliminated chatter in the cut.

B U I L D E R S O F P R E C I S I O N G E A R

GOOD TOOL LIFE IN NON-UNIFORM MATERIAL

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H O B S A N D M A C H I N E S S I N C E 1 9 1 1



Foreman's Duties

In Time of an Emergency



The discussion concerns the foreman's emergency supervision in any possible future period of total warfare, the necessity for maintaining excellent morale under difficult conditions and for carefully conserving our skilled manpower in such a period of extreme emergency.

By ALFRED M. COOPER

THE duties of any industrial supervisor, after analysis, usually classify as either routine or emergency. Some supervisors are good routine men and some are especially good in an emergency, while others are equally good under all circumstances.

In normal times, when almost anything that may come up in the course of a day can be predicted with reasonable accuracy, routine supervision is of paramount importance. Under this heading must be included all of the regular chores of a good boss directing the efforts of the same crew day after day.

Thus, any incentive offered by a foreman for adequate production, any praising or reprimanding, any normal safety precautions observed,

usual checks on the physical condition of the subordinates, promotions, demotions, and discharges—all of the thousand and one things a good boss must look after when things are moving along smoothly—come under the heading of routine supervision. A supervisor who is especially good at taking care of day-by-day situations as these arise is a valuable man. When things are running smoothly, production is satisfactory as to quantity and quality, and the employees are satisfied, he deserves much of the credit. His work is not spectacular, but without his contribution things would not get done as they should.

Quite often the good routine supervisor is also a fine man in an emergency. This is the combination

How prepared are you to meet emergencies in your plant during total warfare?

of qualities management is looking for as replacement material in the executive field—dependability under routine conditions, coupled with the ability to rise to any emergency. Supervisory emergencies are of two kinds—those caused by slip-ups in routine supervision and those unpredictable occurrences resulting from outside interference. The former are in some degree avoidable, while the latter may classify more or less as "acts of God."

The best of supervisors have their moments of absentmindedness, and at such times some very important matters may not be attended to properly. Or the boss may have had a bad day and some trivial happening causes him to blow his top. In either case he may well be faced with an emergency situation dealing with mixed-up schedules or a group of miffed subordinates.

On certain types of supervisory jobs routine supervision and emergency supervision appear to get all scrambled up. Thus, in the course of a discussion of this matter with a group of Los Angeles Fire Department captains, one said, "Well, either all of my supervision classes as emergency, or emergencies become routine in firefighting." He was right, but the group later agreed there was quite a bit of routine supervision in firefighting, covering the essential work done before an alarm is answered.

That type of emergency supervision which deals with situations

that cannot be foreseen or predicted occurs in most plants of today only in case of a catastrophe that strikes with little or no warning—perhaps a destructive tornado, a bone-wracking earthquake, or a devastating fire. Any of these emergencies *can* occur in any plant of today, and the damage that results from such a visitation depends largely on building construction and on the type of men who are running things around there.

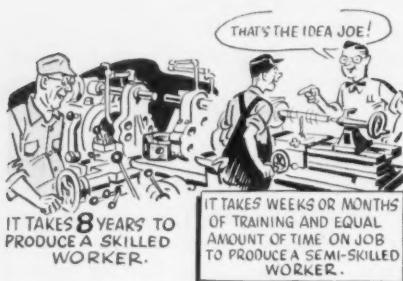
A genuine holocaust is something of a rarity in today's fireproof factories, and routine precautions may be all that will ever be needed to keep any blaze from getting out of hand. Severe earth shocks and great storms unquestionably are acts of God in the legal sense, and while proper construction may obviate much of the damage from these causes it is debatable whether any building in America has been tested by the ultimate it will receive from either quake or twister. But it is when we consider a fourth group of unpleasant contingencies (which could very well be labeled as acts of the devil) that we come to appreciate the true value of clear-headed, courageous emergency supervision.

None of us like to think of the eventuality of another global conflict. But in the uneasy world in which we live, our military would be criminally negligent if it were not tirelessly preparing for such a contingency. And from the stand-

Foreman's Duties in Time of an Emergency

point of production potential (the thing that wins modern wars) our industries also are no doubt well prepared.

However, when we consider any possible third world war strictly from the production angle, we must



"A highly skilled artisan cannot be replaced in less than eight years. Even a semi-skilled worker requires weeks or months of training . . ."

appreciate that here in America we have a limited pool of manpower. Arrayed as we would be against a majority of the world's manpower we must depend upon our limited supply of skilled workers to out-produce those of all enemy countries.

America's industrial strength is so great that we can do exactly this, *providing that we do not lose too many skilled artisans* in bombing raids or through any of the other devilish forms total warfare may take. Therefore, from the supervisory standpoint, national survival becomes essentially a gigantic project of accident prevention—if you

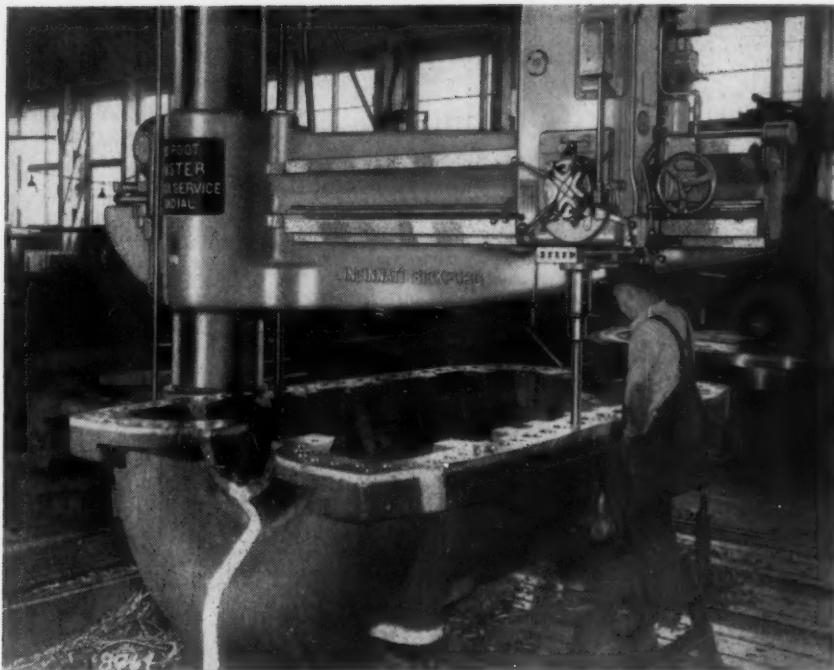
can call atomic and bacteriological warfare an accident.

A highly skilled artisan cannot be replaced in less than eight years. Even a semi-skilled worker requires weeks or months of training and an equal period of experience on the job before he can produce at top efficiency. And even this shorter time may not be allotted to us.

Then too, more and more, our armed forces must be provided with skilled and semi-skilled craftsmen, and replacements for the military must be withdrawn from a limited civilian manpower pool. And, by any realistic appraisal, we have none too many efficient artisans from among whom these various imperative demands must be met. Factory apprenticeship programs are doing a good job, but neither the few public secondary trade schools nor the junior colleges can supply adequate numbers of trained men for shop work. In the field of trade training our system of public education is today notably weak.

The gigantic safety program referred to must include more than just the prevention of injuries. In a moment we will discuss those other responsibilities of the supervisor that deal with maintaining the health and physical wellbeing of subordinates under unusual conditions—powerful factors in morale-building in wartime.

But considering accident prevention first, we must again divide this activity under the headings of routine and emergency supervision. The peacetime accident rates of today may be reduced yet further, principally by the adoption of improved



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Foreman's Duties in Time of an Emergency

training methods and superior day-by-day routine supervision. Whenever the "normal" accident rate can be reduced—in industry, on the highway, and in the home—there will at once be conserved manpower imperatively needed for the replacement of inevitable losses due to enemy activity.

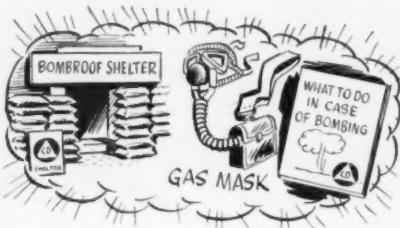
To many of us, civil defense continues to remain but a term. We may be certain that those authorities entrusted with the protection of the civilian population will do all in their power to awaken all of us to the need for preparing beforehand for any contingency. Nevertheless, it is also true that no city ever has been successfully defended against atomic attack. It is also true (and this will not surprise the supervisor) that the success of any program that calls for saving the lives of our workers on the job will depend for its effectiveness primarily on the coolheadedness and foresight of the industrial supervisor.

Thus, we come to the horrid eventuality of emergency supervision in a period of total warfare. In discussing this subject there will be no "experting" attempted by this writer. But in the light of past experience we can consider certain unpleasant possibilities and see what may reasonably be done to meet these contingencies with minimum loss of available manpower.

The supervisor may assume that the mechanics of survival will be taken care of by those fitted for this

task. *Bombproof shelters certainly will be made available, adequate gas masks furnished, and careful instructions issued to every employee as to what he must do in case of a number of emergency situations.* Yet nobody knows better than the experienced supervisor that these instructions will have little real value unless the work force is minded to make use of them and has been trained to do so. And both of these factors depend almost solely on the type of emergency supervision these people receive.

It will be news to no foreman that



"Bombproof shelters certainly will be made available, adequate gasmasks furnished, and careful instructions issued to every employee . . ."

he can't expect his subordinates to cooperate fully in carrying out civil defense procedure unless they have full confidence in him—the boss who gives the orders. But what may be equally important at such a time is that the supervisor must have complete confidence in those who report to him.

Some of those who view the American scene from lofty ivory towers have openly declared that they doubt whether the average American workman can "take it" in the event of all-out enemy attack. The truth is (and every supervisor should know

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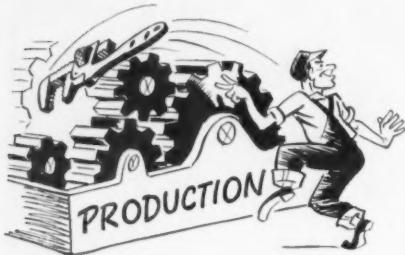
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Foreman's Duties in Time of an Emergency

this) that the American worker will be in there punching, even during the essential reconstruction activity that must follow any devastating raid, while the doubting columnist continues to resist all efforts of those who would evict him from a very deep, bombproof cave. It is true that the average American worker has yet to suffer aerial attack on the job. But it is a serious miscalculation to sell that worker short.

No one seriously doubts that our



"Undoubtedly in any war against communism, many of the more critical emergencies may well be the direct result of sabotage."

fighting men are the equal of any. There is no more reason to doubt the courage of our workers, as compared to those of countries whose industries have experienced attacks from the air. It would appear that some of those who underrate the American workman have their own reasons for hoping he will not stand up to the rigors of enemy attack.

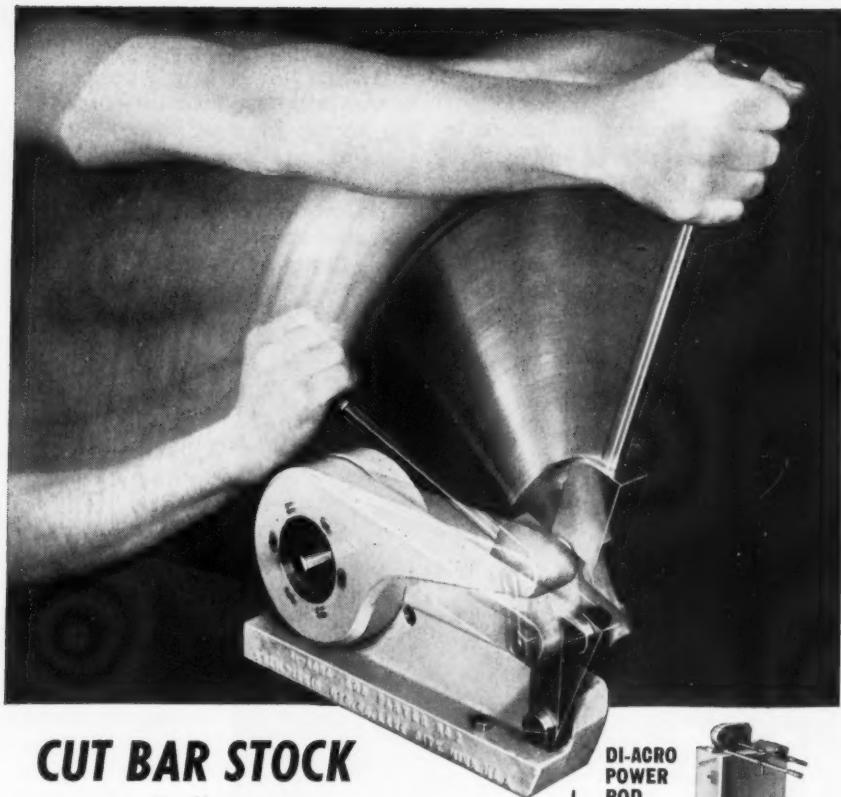
Where mutual confidence exists between worker and his foreman or office supervisor there will be little difficulty in securing implicit con-

formity with civil defense precautions, and later in obtaining the fullest cooperation in record-breaking reconstruction effort. Such abiding confidence is born of a long boss-employee relationship built up during normal times, under conditions calling for essentially routine supervision. In particular, the supervisor who can evince stamina and courage under normal conditions of operation probably will be a good man for the worker to tie to in moments of dire emergency. It is a fact that genuine courage often is called for in meeting the most common, routine affairs in shop or office.

Undoubtedly, in any war against communism, many of the most critical emergencies may well be the direct result of sabotage. In a conflict with that enemy we will find too many native-born Americans who are willing, for private reasons, to sell out their own country. In this respect the situation in all likelihood will be far more acute than during World War II.

Prevention of sabotage will call for expert emergency supervision, coupled with fullest cooperation between the supervisor and his loyal workers. It is generally conceded that the foreman, under ordinary circumstances, should never listen to reports of subordinates regarding other workers except in cases of suspected infectious disease. Here is another instance in which he will do well to listen carefully to grapevine reports and thereafter sift idle rumor from information that merits investigation.

At such a time saboteurs and suspected saboteurs are going to be-



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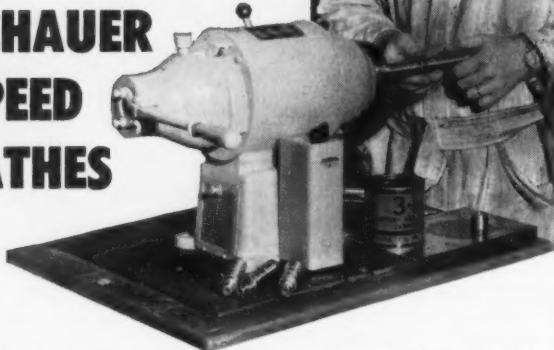
come very unpopular and there is danger of hasty, unwise action. The foreman will do well to avoid snap decisions. Nevertheless, his first responsibility is to his plant, and all information that points to the pos-

sible guilt of any individual therein should be channeled at once to the FBI. The trained personnel of that bureau will have little difficulty sifting rumor from evidence, but the pipeline to the plant supervisory force must be left unimpeded.

Unfortunately, we know now that potential saboteurs in another world war will not be confined to the ranks of the workers. Too many men and women with an educational background so excellent that it should insure beyond question the loyalty of these people to their country already have proved their eagerness to sell out that country to the communists. It would appear that there is a creeping poison inherent in that rotten creed which dulls the minds of people who should have more horse sense than to fall completely for the specious but glittering promises of Marxism.

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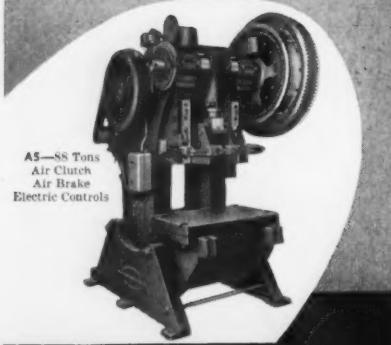
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**Foreman's Duties in Time of an
Emergency**

conditions the supervisor will have many extraordinary problems to solve, in addition to those involving sabotage. Principal among these will be the maintenance of a high degree of worker morale under extremely difficult circumstances.

Despite the fact that our industries never were seriously threatened by aerial attack during World War II, the morale of the workers in our munition plants never reached a very high level. This unfortunate situation did not develop as a result of extraneous hazards or imposed stringencies. It was the direct result of leaning over backwards in an effort to make the worker happy. The thing backfired on us. *We probably overdid the brass bands, the dance halls for swingshift workers, and the blaring loudspeakers.* We developed something in these workers, but it was not the high degree of morale that we sought. Rather, we suc-



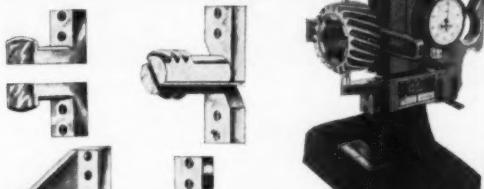
"We probably overdid the brass bands, the dance halls for swingshift workers, and the blaring loudspeakers."

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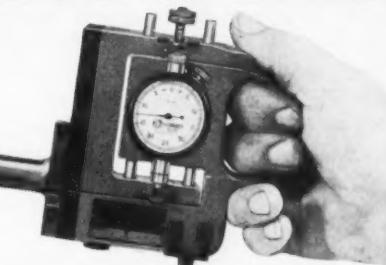
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Foreman's Duties in Time of an Emergency

ceeded in converting too many into temperamental prima donnas.

In another war we may find it wise to dispense with much of the hoopla, foofaraw, and vaudeville and stick to sound principles of morale development. In such a conflict none of us will be seeking amusement on the job.

Nevertheless, a high degree of morale can be developed, even under the most trying circumstances. Perhaps the best comparison here would be to the type of morale you find in our armed forces. Fighting morale is not developed by entertainment. Rather, it is the product of the fighter's confidence in his superiors, his faith in the men of his own outfit,

fit, and his sincere belief that his is the best of all possible outfits. That's fighting morale.

In factories subject to enemy attack something very much like this fighting spirit must prevail. It is reasonable to believe that those who have experienced even one bombing raid or bacteriological attack will develop so deep and abiding an anger toward the enemy that this will serve as a better morale builder than any number of pep talks.

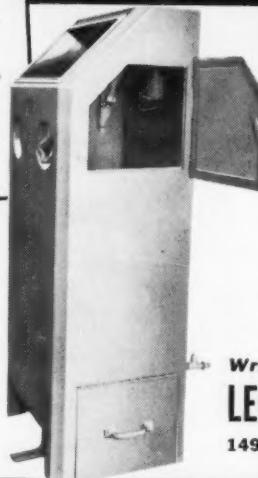
In that war we cannot waste time experimenting with innovations in morale building. We will do well to stick to those fundamentals that have proved sound through the years—good pay, good treatment, good tools and equipment, and the very best and safest working conditions that the exigencies of total warfare will permit.

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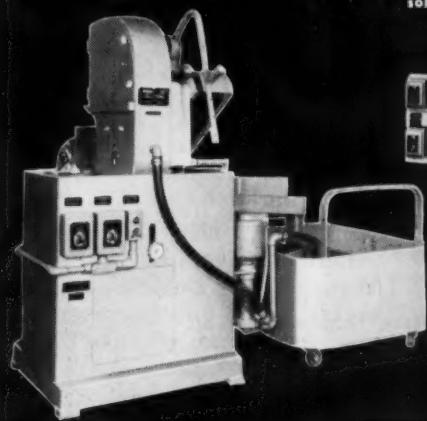
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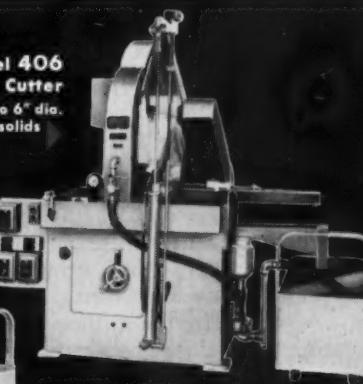
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Foreman's Duties in Time of an Emergency

On the job, admittedly conditions will at times become very rugged. But there are certain things that management can do which will make the worker's leisure hours safe and enjoyable. Even in wartime these men and women must be assured opportunities for recreation.

Under the conditions that will prevail it is likely that crowds, either in stadiums or taverns, will be frowned upon by the authorities. Fortunately this does not mean the worker and his family must remain at home. This country is blessed with a multitude of recreational areas, and many of these are right next door to our great industrial centers. **These wooded**, mountainous, and desert regions frequently are state or federal preserves, and as such have, during past wars, been made available as rest billets only to members of the armed forces. In a war in which everyone is a combatant all restrictions regarding the use of these facilities by industrial work-

ers must be removed. The governmental custodians of this land must understand that men and women who are producing the munitions of war can be trusted not to sabotage a forest.

The workman who can occasionally take his wife and children to such a spot for 48 hours will appreciate the surcease from strain and worry and the opportunity to relax, have a bit of fun, and above all, to sleep soundly. It may also be found advisable to arrange for the care of his children in such areas for the duration.

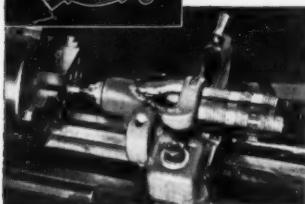
Freedom from worry about the welfare of his family in time of enemy attack should be assured the worker in the greatest possible degree. Aside from effective civil defense measures, nothing will relieve the mind of the harassed reconstruction workman so much as the sure knowledge, afforded him in the shortest possible time, that his loved ones have weathered that attack and are safe and unharmed. Such assurance should be automatically relayed to these men at the conclusion of any attack, and here again the responsibility for seeing that this is done must rest with the immediate supervisor.

In such a war as any new world conflict inevitably must be, it will become increasingly apparent that industry without the services of its supervisory force would be in as tough a spot as an army without its noncoms. Top-level planning, both by management and by civil-defense experts, is essential, as is the existence of a loyal, capable work force. *But those immediate supervisors*



"The workman who can occasionally take his wife and children to such a spot . . . will appreciate the surcease from strain and worry . . . "

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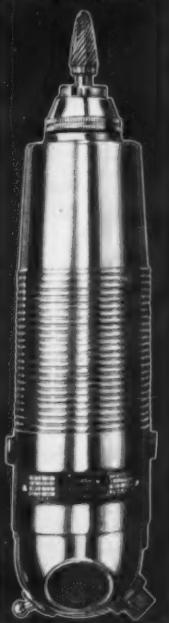
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Foreman's Duties in Time of an Emergency

will continue to be the key men who can make good plans work effectively and somehow bolster the bad ones. For this reason it is imperative that the supervisor, upon whom so much of the will to resist depends, must be conserved, both physically and mentally. Good supervisors can never be considered as expendable.

Yet under conditions of total warfare the best supervisors are likely to be the very ones who will tend to overwork and needlessly expose themselves to deadly hazards. Only management is in a position to spot those foremen who have passed the limits of human endurance and who must be forced to take a real rest period, well removed from the conditions of "front-line" service.

In the event of another global conflict absenteeism, as the term is applied to members of the work force, may well come to be considered as being synonymous with disloyalty. In that war malingering will become most unfashionable, as will laying off to spend swollen paychecks. Both of these handicaps to

maximum worker output were too much in evidence during the days of World War II.

It would be wishful thinking to assume that absenteeism and goldbricking will disappear just as soon as we again find ourselves at war. But where there exists the possibility of injury on the job from enemy attack the man who tends to stay at home by choice doubtless will be treated quite roughly by his



"... immediate supervisors will continue to be the key men who can make good plans work effectively and somehow bolster the bad ones."

fellow workmen, and this alone should make the malingerer think twice before he deserts his post.

Likewise, the goldbricker will find himself so unpopular when there is grueling work to be done that he would have to possess the hide of a rhinoceros to withstand the jibes of the other workers. Thus, in another war two of the worst morale prob-

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Foreman's Duties in Time of an Emergency

lems of wartime production may solve themselves with little effort on the part of the supervisor. There must be no falling off in the output of the individual worker.

Much of the supervisor's work in

a period of total warfare must classify as emergency supervision. *On his shoulders will rest the major responsibility for carrying out production schedules verging on the impossible; for rebuilding damaged plants in record time; for the swift apprehension of the saboteur, even before the planned damage has been done; for maintaining high worker morale in the face of devastating setbacks; for conserving manpower by helping to cut normal accident rates to the bone; and by preventing death and injury to his subordinates during the time of, as well as after, enemy at-*



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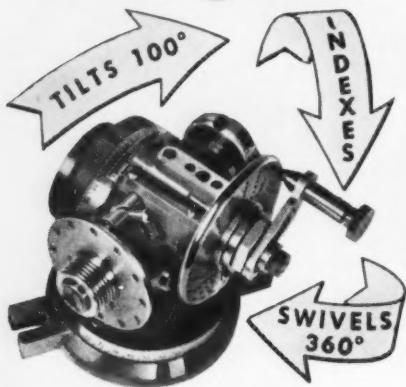
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Foreman's Duties in Time of an Emergency

tacks. At such a time as this we may well be thankful that our industries are today staffed with top-quality supervisors.

In time of peace it is sometimes difficult to conceive of our peaceful countryside undergoing attack in any form. It would be nice if, by turning our backs on such a possibility, we could thereby eradicate it and thereafter concentrate our energies on peacetime production.

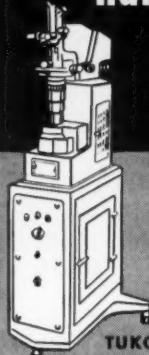
Unfortunately, we probably will have little to say about when the next war will be fought. Certainly we will not start it. But it would appear that the world may yet be one war removed from an era of lasting peace. Perhaps the present precarious world situation may prevail for years. But nothing can excuse the failure of either the military or industry to be completely prepared for any eventuality. This time we will not be accorded a couple of years to get ready.

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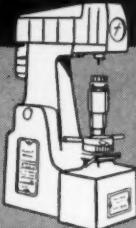
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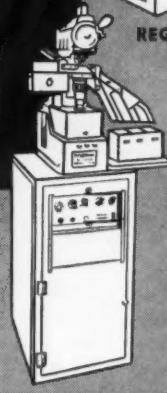
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Meetings

Important Meeting Dates



February 14-17 • American Institute of Mining and Metallurgical Engineers, Annual Meeting, Conrad Hilton Hotel, Chicago. Institute headquarters: 29 W. 39th St., New York, N. Y.

February 16 • American Society of Mechanical Engineers, Founding Anniversary Meeting, New York. Society headquarters: 29 W. 39th St., New York, N. Y.

February 17-18 • Drop Forging Association, Winter Industry Meeting, Statler Hotel, New York. Association headquarters: 605 Hanna Bldg., Cleveland, Ohio.

March 14-18 • American Society of Tool Engineers, First Western Industrial Exposition, Shrine Auditorium and Shrine Exposition Hall, Los Angeles. Society headquarters: 10700 Puritan Ave., Detroit 38, Mich.

March 16-18 • Pressed Metal Institute, Sixth Annual Spring Technical Meeting, Hotel Carter, Cleveland. Institute headquarters: 2860 E. 130th St., Cleveland 20, Ohio.

March 28-April 1 • American Society for Metals, 9th Western Metal Congress and Exposition, Pan-Pacific Auditorium, Los Angeles. Society headquarters: 7301 Euclid Ave., Cleveland 3, Ohio.

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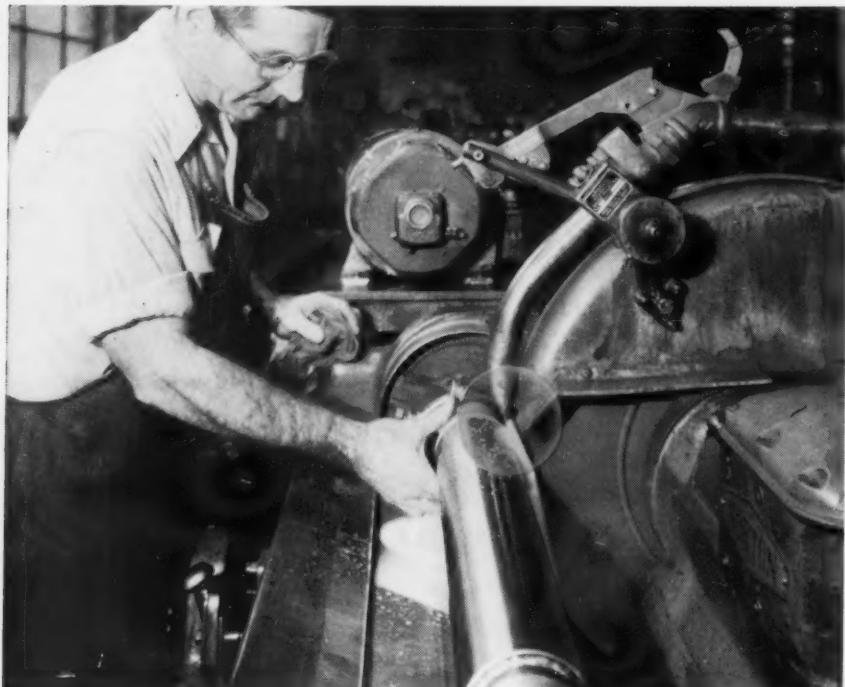
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Users all over the country report that Norton G Bond wheels have given them an entirely new slant on the profit-possibilities of their centerless and cylindrical grinding jobs.

The two examples pictured here are typical of the very many enthusiastic endorsements that are pouring in. And you could sum them all up in this sentence: "G Bond wheels grind faster, finish better, last longer and save us money on every job."

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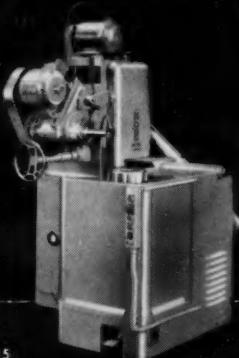


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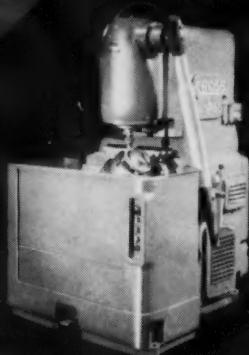
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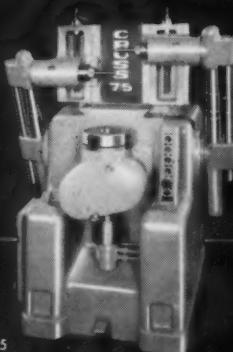
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Essentials in Good Gage Practice

Part II

By C. W. KENNEDY

Additional basic conditions with which a gagemaker contends and other fundamentals he considers in correct design are treated in this installment.

AN article in the preceding issue of this magazine outlined several of the fundamentals underlying good gage design. It was presented on the premise that the prevailing industrial tendency is to design and make a specific gage for the job, rather than rely on traditional gaging equipment, and that it is becoming increasingly necessary, consequently, for those who will consider, select, help to design, buy or use special purpose gaging apparatus to

have at least an appreciation of certain basic gaging principles.

Of the several factors or elements in the design of a gage that need to be known or remembered, if the result is to be successful, the hindering effects of friction and inertia in gaging mechanisms were discussed. The previous installment also permitted space for descriptions of gage sensitivity and repetition. Other basic conditions with which a gagemaker contends and other fundamentals he considers in correct design are treated briefly in what follows.

Deflection

The inevitability of Newton's law that action and reaction are equal and opposite seems so often forgotten both when it comes to designing the structure

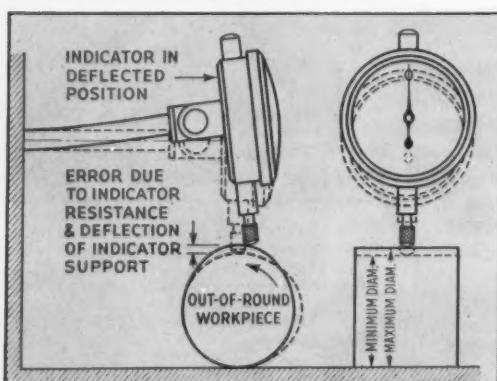


Fig. 10 — The effect of deflection when a test set is used is shown in this illustration.



Fig. 12—Observe the rugged cross-section of gage frame required so that frame deflection will not affect the accuracy of the reading.

of a gage and arranging a setup of measuring apparatus—also in using them. If force in the form of pressure is applied to a gaging mechanism in order to secure a measurement, the reaction to that force has to go somewhere. There is a natural inclination to feel, perhaps, that the pressure applied in using a gage (which is the "action" of Newton's law) seems so slight that the opposite reaction should have a less than negligible effect.

But mike a piece with a 4-in. micrometer, for example, and its C-frame will spring back or spread open at least a couple of tenths. What seems ordinary pressure on the mike thimble, as the spindle is screwed down onto the workpiece, often registers a frame deflection

of about half a thousandth, and the heavy handed mechanic can make the mike frame spread in reaction practically a full thousandth.

The effect of deflection when a test set is used is illustrated in Fig. 10. An indicator ordinarily exerts no more than an ounce of pressure on a workpiece, yet the reaction to its light thrust can make the arm of a test set spring back measurably. Deflection settles the old argument of whether or not an exact 1-in. plug will enter an exact 1-inch ring. With the aid of a little oil the plug can be forced into the ring but extra careful measurement will show the ring's slight expansion in reaction to accommodate the plug.

The ordinary flush pin gage readily illustrates the effect of gage frame deflection. In particular, the diagram of the gage in Fig. 11 illustrates the added effect of leverage. Suppose a flush pin gage is unwittingly designed with a deep throat as shown in

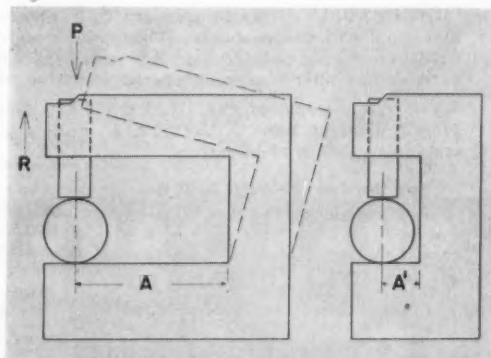


Fig. 11—This diagram illustrates the added effect of leverage on gage frame deflection.

the left-hand sketch in Fig. 11. The pressure P down on the pin, necessary to obtain the measurement, produces, through friction*, an equal and opposite reaction, R . Without going with exactness into the technology of moment arms, the frame

* Read over again the discussion of friction in a flush pin gage presented in the preceding installment of this magazine.

of the gage will tend to spring open a little after the fashion shown in exaggerated form by the dotted lines in the left-hand sketch of Fig. 11. If the gage is designed as in the right-hand sketch, the moment arm A is reduced to A' and the leverage effect with it.

The type of gage shown in Fig. 12, which is used to measure the thickness of so-called soft materials like paper, rubber, felt and plastics, displays the gage designer's attention to gaging pressure reaction and the consequent peculiar frame structure to prevent deflection. The downward pressure exerted by the gage in measuring is controlled by the

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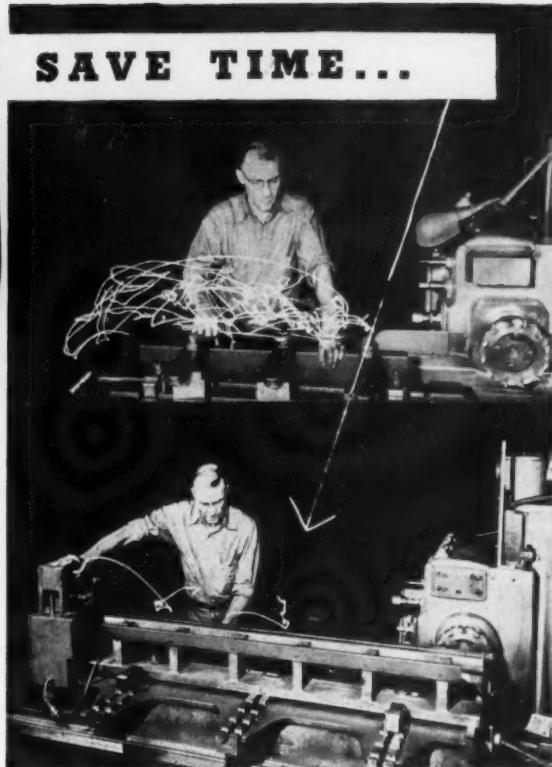


Fig. 13—This illustration shows a type of insulating handle used on snap gage frames to dissipate the heat of the user's hand.

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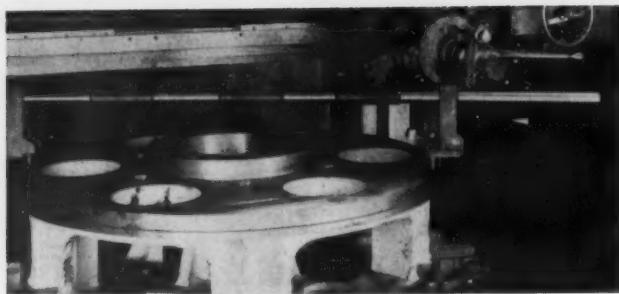


Fig. 14 — This view shows a gage—longer than a man is tall—which is used to measure shallow inside and outside diameters while the work is still on the bed of the machine.

weight resting on the indicator spindle. That dead weight varies according to weights and anvil diameters established by various industrial associations—like, for instance, 6 oz. for textiles, 10 oz. for felt, 20 oz. for insulation, 35 oz. for paper, and so on. At the most, this is not much more pressure than a man exerts with a pencil on paper, but observe

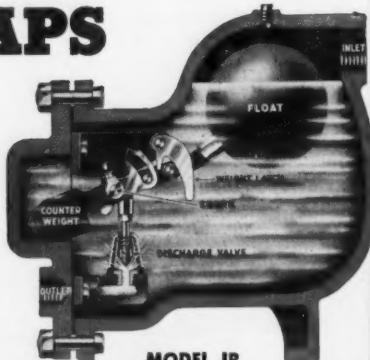
from Fig. 12 the rugged cross-section of gage frame required so that frame deflection will not affect the accuracy of the reading.

Many gages make use of the spring-loaded plunger principle to bring measuring pressure against the workpiece. The experienced gage designer will see that what might be called the spring rate of the gage frame is at least many times the rate

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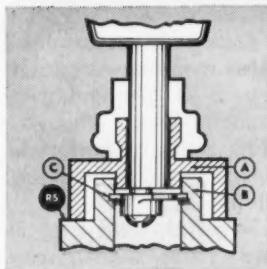
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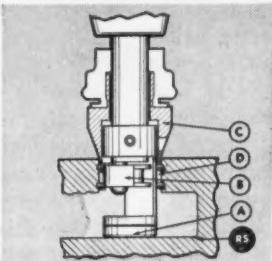
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Waldes Truarc Grooving Tool Out-Performs Conventional Recessing Tools

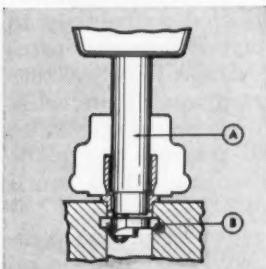
SAVES TIME! CUTS COSTS! NEEDS NO SKILLED LABOR!



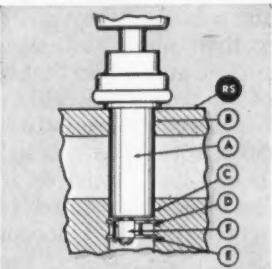
Clearing Obstructions or Protrusions —
Waldes Truarc Grooving Tool with special bushing with high shoulder A in order to clear obstruction B on reference surface RS so groove can be properly located in bore.



Locating Grooves from Bottom of Hole or Blind Hole — Use of bottom adaptor A and double cutter B. Bushing C pilots tool into bore D while bottom adaptor acts as stop to locate grooves from reference surfaces RS below bore.



Small Diameter Bore — Need for Wide Groove — Great versatility of tools allows A-2 Tool to accept stepped down spindle and cuttershaft assembly A. Provides cutting capacity in a bore normally within the range of smaller A-1 Tool. Illustrated, larger tool capacity necessary to cut groove diameter B exceeding normal capacity of standard A-1 Tool.



Extending Reach of Tool — Waldes Truarc Grooving Tool assembled with extended bushing A increases normal range of tool in order to reach proper groove location in bore. Bushing also registers on reference surface RS of workpiece while piloting tool at two points B and C inside bore. Two grooves D and E are cut simultaneously with double cutter F.

AMAZINGLY VERSATILE!

The Waldes Truarc Grooving Tool adapts quickly and simply to your toughest recessing requirements. With it, even unskilled labor can perform high precision, mass production operations.

WIDE CUTTING RANGE!

The Waldes Truarc Grooving Tool comes in five models: A-1, A-2, A-3, B and C. This wide variety of models enables you to cut accurate grooves in housings with diameters from .250 to 5.000 inches. Special features, modifications and adaptations allow each model to operate efficiently under many varying conditions.

SEND YOUR PROBLEM TO WALDES!

Whatever your internal grooving problem, send us your blueprints and let Waldes Truarc engineers give you a complete analysis, price quotation and delivery information on the most economical tool set-up for your particular job.

WRITE NOW FOR 20-PAGE TECHNICAL MANUAL
CONTAINING FULL ENGINEERING DATA

WALDES

TRUARC

Reg. U.S. Pat. Off.

GROOVING TOOL

MADE BY THE
MANUFACTURERS OF WALDES TRUARC RETAINING RINGS

WALDES KOHINOOR, INC., 47-16 Austel Pl., L.I.C. I, N.Y.
Waldes Truarc Grooving Tool mfd. under U.S. Pat. 2,411,426



MM-027
Waldes Kohinoor, Inc., 47-16 Austel Place
Long Island City 1, New York

Please send me your new 20-page technical manual on the Waldes Truarc Grooving Tool.

Name _____

Title _____

Company _____

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City _____ Zone _____ State _____

**"... enemy of sensitivity,
accuracy and repetition."**

of the spring actuating the measuring contact. In other words, good gage design or use will not concede much percentage error for any possible inaccuracy due to deflection.

Deflection cannot be calculated or accounted for until the amount of gaging pressure exerted by the measuring contacts has been established. In this particular there are few if any standards completely agreed upon. Several standardized gaging pressures or specific materials were mentioned in a paragraph above. The average dial indicator seldom exerts a pressure greater than an ounce. The micrometer ratchet and the spring-loaded anvil of an indicating mike are usually designed so that the anvils clamp on the workpiece in the amount of a pound and a half, or a little more. The contact spindle of an electronic gage often has a regulated pressure which can be varied from 2 to 18 ounces. If the question of a generally standard gag-

ing pressure comes up in conversation, the answer often (glibly) is 2 pounds. Occasionally the particular circumstance of contacting a workpiece in a special design, multiple measurement gage or in an automatic gage requires measuring contact pressures up to 5 or 6 pounds. At the other extreme, there are some extremely yielding parts or materials which must be measured by contactless or pressureless gaging.

One thing is certain and that is gaging pressure should be as light as possible to still obtain correct, accurate measurements capable of repetition. Take a thread plug gage. The experienced mechanic knows they are often used deliberately to finish size a tapped hole, an operation that takes a thick wrist and considerable elbow grease. To measure properly with a thread gage, about as much hand pressure should be used on it as writing with a pencil requires.

Unneeded gage pressure is the enemy of sensitivity, accuracy and repetition. Measuring contact should be firm and unwavering. There is no

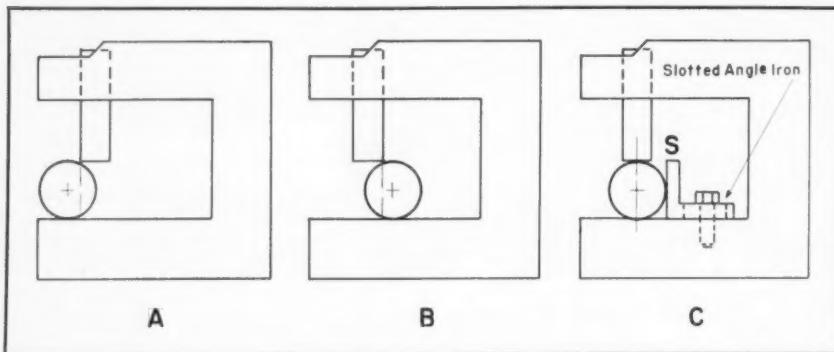


Fig. 15—Using the flush pin gage as an example, this sketch illustrates the philosophy of ready workpiece positioning.

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Aug. 7, 1954 - 3:58.8

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hand methods in your
ASSEMBLY DEPARTMENT!

DPS POWER SCREWDRIVERS and SELECTIVE PARTS FEEDERS are the answer!

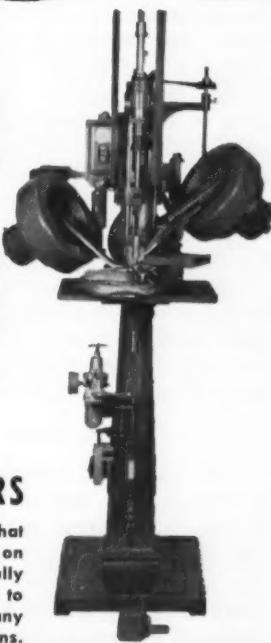
• While these champions may be tops in their field, DPS Assembling Equipment is a leading factor in the American Industrial Field—And not only in the matter of speed, (with a record of driving screws at one per second) but in economy effected through labor-saving and greater accuracy through the elimination of manual handling.

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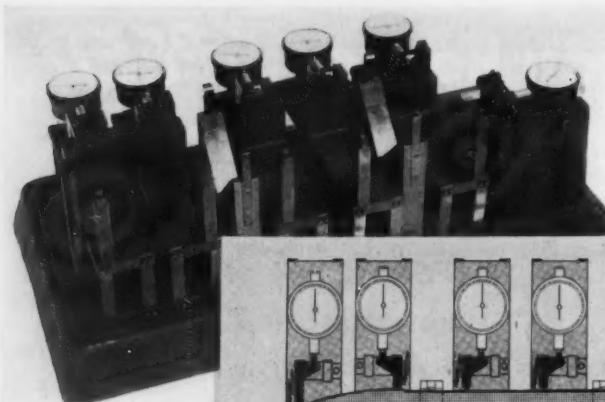
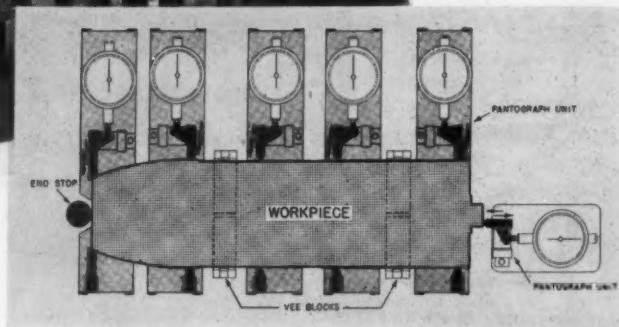


Fig. 16—This illustration shows a type of gage apparatus whereby the operator can all but toss a complex workpiece into the gage and come up instantly with accurate readings of all the multiple dimensions.



need of a clamping, vise-like action. Too much pressure sets up retarding friction in the mechanism, as well as deflection. The amateur gage designer can whirl himself into a vicious circle by designing too much spring pressure into a contacting mechanism and then, because he has unwittingly created so much friction he has defeated sensitivity, he adds more spring pressure, which in turn makes the gage mechanism bind still more, and so on ad infinitum.

Temperature

Deflection and inherent gaging inaccuracies are caused not only by friction and excess gaging pressure but also by temperature changes in the gage frame and mechanism. Temperature enters as a factor especially, of course, in the case of portable gages. A 10-in. micrometer frame, for example, will expand enough to create a measurement error of 0.0015 in. if it is held steadily in

the hand in ordinary fashion for 5 minutes, and it takes the instrument at least 20 minutes, lying on the bench, to cool off enough to measure correctly.

Since modern gaging is growing rapidly beyond the capacity of small hand tools, the designer, more and more, finds himself providing means to prevent gaging errors from temperature expansion. His principal defense is insulation. Figure 13 concentrates attention on an insulating handle used on snap gage frames. This is a sort of spring clip device whose perforations are designed primarily to dissipate the heat of the hand of the user. The perforated handle is further insulated from the body of the gage by fiber spacers. The perforations also pay a side dividend in offering greasy hands a better grip on the gage.

Fiber grips, shields and liners can

The story of 5 benefits Wayne Screw Products gets from using STANICUT CUTTING OIL



Plant Foreman Al Ziegman (left) and Standard industrial lubrication specialist L. J. Loomis examine pitch diameter of screw threads. L. J. Loomis' engineering background plus his field experience in industrial lubrication, customers find, pays off for them. Lee is a graduate of Tri-State College of Indiana with a B.S. degree. Before entering field work, he completed Standard Sales Engineering School.

STANICUT 137 BC Oil solved finish problem for Wayne Screw Products Company, gave better finish on screw and machined parts like these—plus four other important benefits.

Management at Wayne Screw Products Company, Detroit, found they were not getting a completely satisfactory finish on aircraft quality stainless steel, which the plant was machining. They followed a suggestion made by their Standard Oil lubrication specialist to switch to STANICUT 137 BC Oil. The result: five benefits. (1) Better finish. (2) Higher quality work. (3) Longer tool life. (4) Higher production because of less down time for tool sharpening and adjusting. (5) Cutting oil costs reduced approximately 50%.

At first STANICUT 137 BC Oil was used in two automatic screw machines—a National Acme Multi-Spindle and a Brown & Sharpe Single Spindle. Production benefits prompted Wayne Screw Products to convert other equipment to STANICUT 137 BC Oil—and with similar results.

Delivering benefits like this is an old story for STANICUT 137 BC Oil. A Standard lubrication specialist will be happy to show you how. In the mid-west, call your nearby Standard Oil office. Or contact: Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



STANDARD OIL COMPANY (Indiana)

be applied in gage design to offset temperature transfer not only from the user's hands but also from vagrant drafts or streaks of direct sunlight which can cause an inspector to come up with the wrong reading. Figure 14 shows a gage—longer than a man is tall—which is used to measure shallow inside or outside diameters while, as the illustration shows, the work is still on the bed of the machine. The "frame" of this gage, which is essentially a long steel tube, has been cased in insulating fiber throughout its length to mitigate the effect of drafts, sun rays or machine heat. In addition, extra thicknesses of fiber have been applied as hand grips.

Location

Any modern gage design worth its salt includes means to locate the workpiece quickly for accurate meas-

urement. In the old days gaging apparatus was designed to do measuring itself well enough but it left the proper positioning of the gage to the skill of the user. Today's accelerated production permits the mechanic little time to fiddle around trying to position an instrument to measure the size of his work.

Using the flush pin gage again as an example, the philosophy of ready workpiece positioning can be illustrated. It is very possible, for instance, for an operator, either carelessly or in a rush, to measure a cylindrical workpiece under a flush pin in the manner shown in sketch A of Fig. 15. Moving fast and without realizing his error, the operator checks a chord of the circular section. Or, over anxious, he may make the similar mistake illustrated at B in Fig. 15.

A simple attachment like the adjustable backstop S sketched at C in Fig. 15 self-evidently eliminates the difficulties implied in sketches A and B, as well as increases the confidence and speed of the operator using a gage which automatically positions the work.

If an operator can all but toss a complex workpiece into a gage and come up

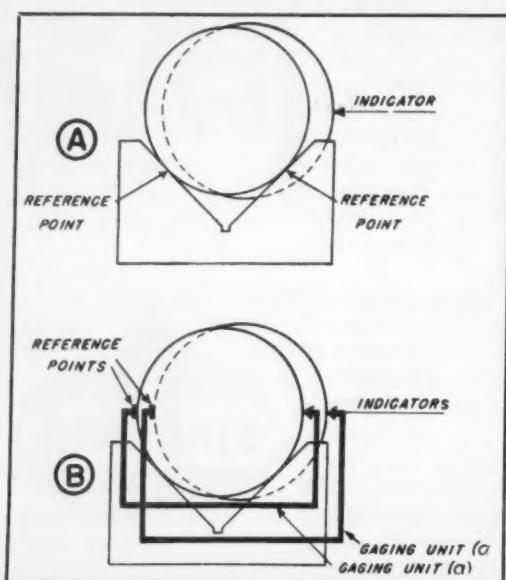
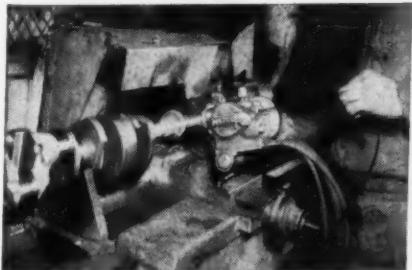


Fig. 17—The geometrical effect of concentricity measurement alone, where V-block positioning is involved, is shown at A in this sketch. The view B shows the geometry of spring leaf pantograph devices on which the indicating caliper units are mounted to allow the calipers to swing back and forth and thus neutralize any error from eccentricity.

when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.

...and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours.

Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. You haven't just salvaged a part—you've improved it.

Free Bulletin



Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for copy.

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Please have Metco Field Engineer call.

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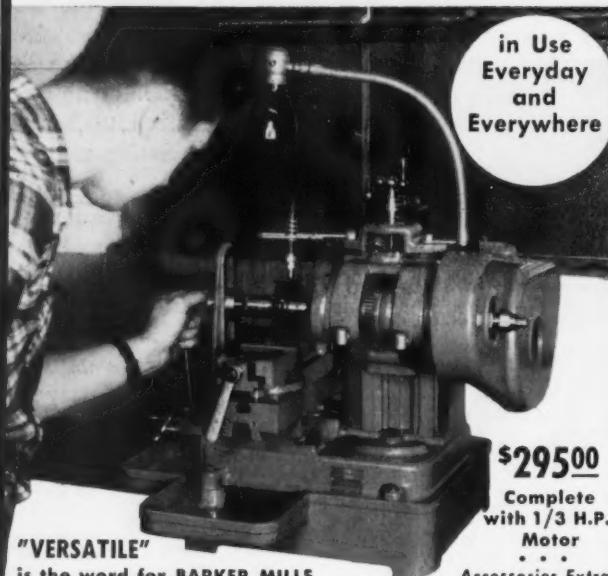
instantly with accurate readings of all the multiple dimensions, he is living up to the modern conception of manufacturing efficiency. A representative example of the type of gaging apparatus implied is shown in Fig. 16. The automatic screw machine operator in this case scarcely interrupts his machining cycle to slide each piece into and

out of the gage. In fact, he could be lighting a cigarette with one hand while he checks the measurements of his work with the other.

For a gage like that in Fig. 16 to approach the effectiveness the slightly extravagant description above implies that the gage designer had to pay considerable attention to positioning or location, among other things. The gage used a favorite device for locating cylindrical work — the V-block. Since the workpieces were long and heavy, the designer can include a pair of them. A V-block not only centers a cylinder, as is well known, but its wedging effect has the knack of holding a piece steady for caliperizing purposes and, at the same time, it receives the work readily in sort of open mouth fashion.

Notice from the gage diagram accompanying the illustration in Fig. 16 that the workpiece had to be caliperized at rather exact longitudinal locations.

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NOTICE

The New

SIBLEY MODEL D DRILLING MACHINES in 24" and 28" SWING

Gains greater productivity and operator efficiency from V-belt drive direct to a 4-speed geared transmission, controlled by a conveniently located lever. 4-station switch at front of machine includes an "inching" button for easy change of speeds.

25" head travel on hand-scraped column; 11" spindle feed; 1 1/4" drilling capacity in mild steel. The heavy table arm assures rigidity and swings on column, to make the machined base accessible for a working surface.

Standard equipment includes automatic spindle stop; geared power feeds; back gears.

Model D-24 Drilling Machine is illustrated complete with coolant pump and fittings, electrical reversing, 5 H.P. motor, magnetic starting switch, rectangular oil groove table.



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**"... accurate caliper ...
could be thrown off ..."**

And an overall length check was required. Consequently, the designer incorporated a tapered top stop, at one end and a spring pantograph at the other end so that the workpiece would drop in neatly and just about automatically snap into correct positioning.

Sometimes the several sections of a multi-diameter piece like the one shown in Fig. 16 fail to come out machined exactly concentric with one another. As a result, with one diameter centered in a V-block, the accurate caliper reading of the other diameters could be thrown off by their indicators registering simultaneously some degree of eccentricity.

★ ★ ★ ★

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Two double rows of ball bearings in the large and small ends of this Bull Nose Center mean perfect alignment on any type of work.

Two shank sizes provide diameters from $\frac{1}{2}$ " to $7\frac{1}{2}$ " for a variety of work with a single center. Write for catalog.

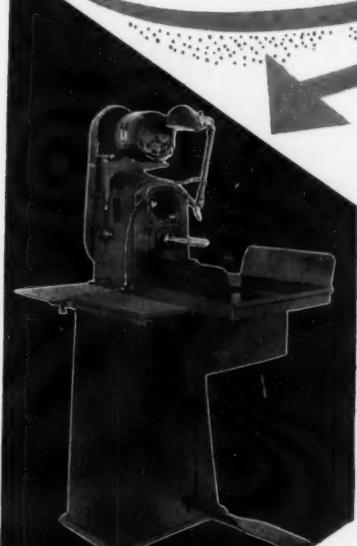
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Your Honing Dollars
by putting them in Superior's
NEW COMBINATION PEDESTAL MODEL JCP
HONING MACHINE AND COOLANT UNIT



- ★ Hones over keyways, spline gears and most broken surfaces.
- ★ Counter-balanced foot pedal adjustable to any desired pressure.
- ★ Expandable splash tray on coolant unit affords an additional 10-inch extension for long work. Keeps oil splash and mist off the floor and operator's feet.

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- ★ Coolant unit quickly disassembled for easy, complete cleaning.
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- ★ Height: 60 $\frac{3}{16}$ ". Width: 33 $\frac{3}{16}$ ". Depth: 31", 41" with extension pan open.

Although this 10-Star honing equipment is the finest that money can buy, the price is amazingly low—much less than you'd believe possible. The cost of NOT installing it now is the important consideration.

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cal section it is caliper and thus neutralizing any error from eccentricity.

Another often used positioning mechanism, the spring-loaded mandrel, is shown in Fig. 18. There are numerous circumstances where the measuring reference must be taken from a hole or bore. The uninitiated often first thinks of plugging the hole with something like a piece of drill rod or a plug gage. Or the idea arrives of forcing the workpiece onto an arbor.

The spring-loaded mandrel design first and foremost allows the gage to be loaded quickly. A single quick thrust positions the workpiece for measurement. Secondly, the spring-loaded mandrel, in contrast to any sort of solid plug or arbor, compensates for the natural i.d. variations in workpieces, as well as out-of-round and taper. As the sketch accompanying the illustration in Fig. 18 indicates, the spring-loaded man-

drel finds the geometrical center of the workpiece and thus permits errorproof measurement of those dimensional characteristics in the workpiece which must be obtained by reference to its center line. In the case of the piece shown in Fig. 18, the setup permitted accurate checking of the concentricity between o.d. and i.d. (uniform wall thickness, in other words) and of the squareness of the top and bottom flange faces with the bore.

The gage designer today tries to fit his apparatus successfully into several circumstances peculiar to modern manufacturing. First, tolerances are closer. Everyday gaging equipment must measure accurately in tenths if not in millionths. Secondly, the gage designer can seldom depend on the possibility that the old time skilled craftsman will be using his equipment. Shops now employ "operators" to man practical automatic machines which are set up and adjusted for them by tool-setter specialists. A gage, once set up also by a specialist, must likewise give precision results in the hands of a relatively untrained, unskilled worker. Finally, any gaging checks have to

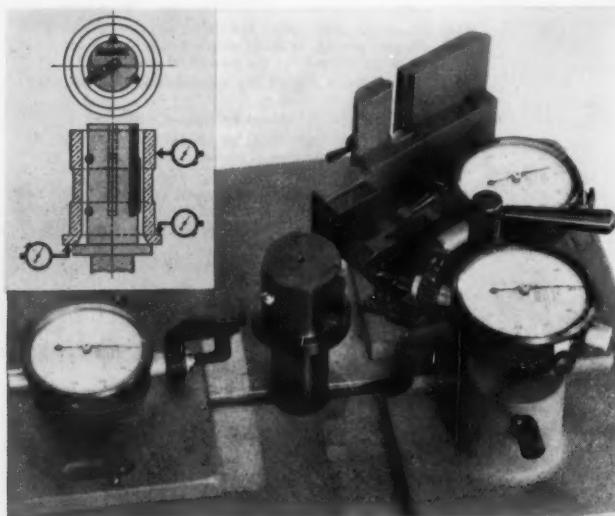


Fig. 18—Another often used positioning mechanism — the spring-loaded mandrel—is shown in this illustration.

Tap-Cartridges

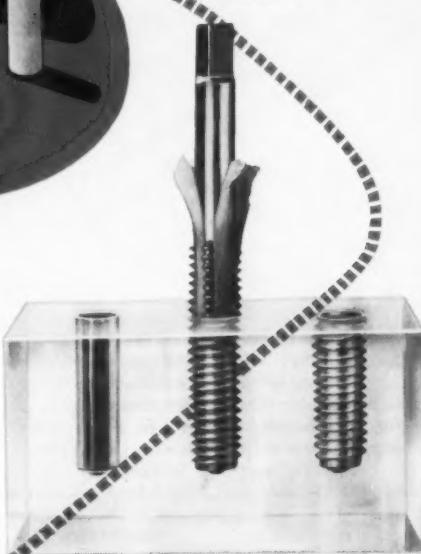


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tapping to very bottom of hole in one fast operation, insuring clean . . . uniform threads



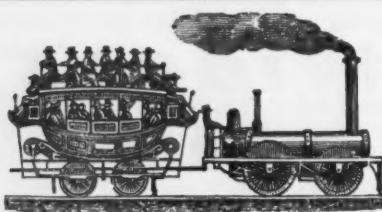
The illustration above shows tapping into Plexiglass, allowing photography to show operation at various stages through the clear material.

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be secured at high speed. The stopwatch boys allow but a few seconds in a machining cycle for the determination of conformance to blueprints.

(More ideas and means which the gage designer uses to keep his apparatus in line with modern manufacturing methods will be discussed in the next issue.)



For further information on any product mentioned in this issue — use the READER SERVICE CARDS between the covers.



"I understand, Marlin, that you've been going out for haircuts on company time."

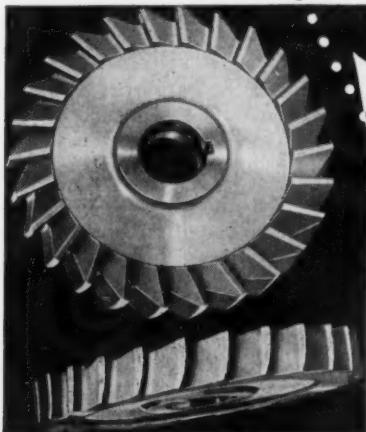
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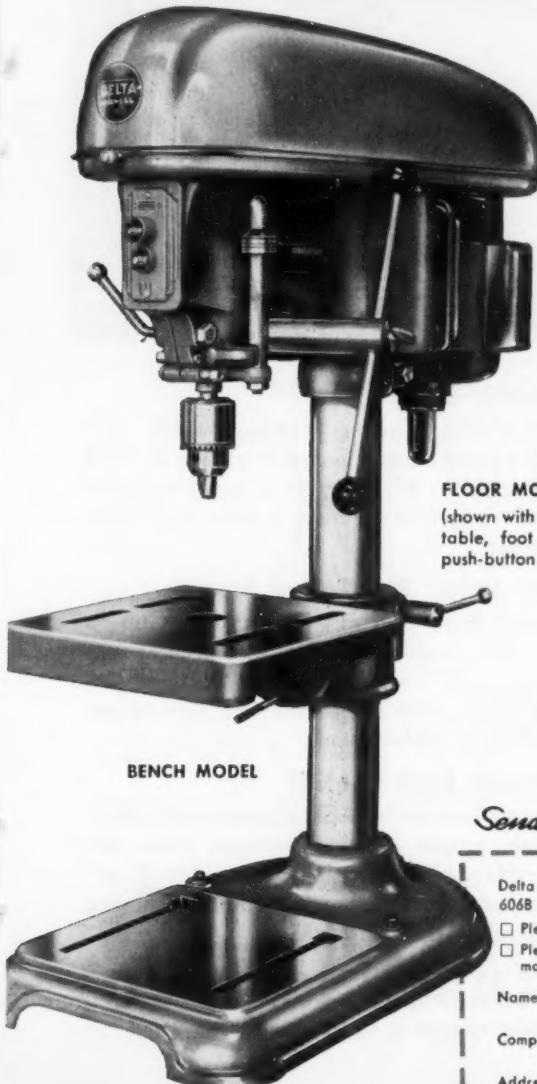
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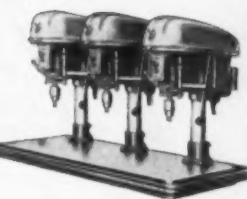
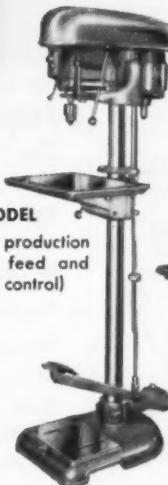


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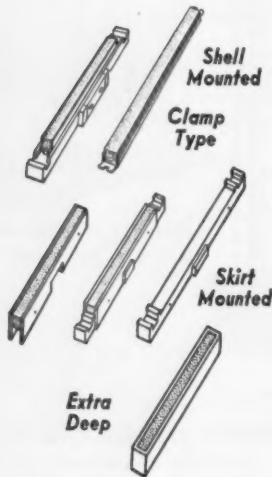
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The Plugmatic Gauging Member directly sizes the bore being honed. Gauge is self-aligning and not affected by misalignment or eccentric stone wear. Bore-to-Bore accuracy is guaranteed within "tenths".

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Patented Barnesdril mounting provides up to 300% more usable stone life, with greater support closer to the cutting edge. Freer cutting action results, with longer abrasive life and less downtime for replacement.

* Electronic Feed Control

Electronic feed control operates automatically to maintain proper pressure between stone and work surface at all times. Adjusts automatically to compensate for stone wear, and keeps honing operation at peak efficiency.

Write for Catalog 500E

BARNES DRILL CO.

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• ROCKFORD, ILLINOIS



BURGMASTER[®] TURRET DRILLS

with POWER INDEXING

"Without the
BURGMASERS our
costs to produce
this part would
have been almost
prohibitive"

REPORT FROM: **AMPEX CORPORATION**

REDWOOD CITY, CALIF.

ROLF J. GRUENSTEIN, Sup't. of Fabrication

In the fabrication of Ampex CinemaScope Sound Systems used in theaters all over the world, one casting requires 42 separate drilling, tapping, reaming or counterboring operations. This includes drilling holes from #57 (.043 inches) to 3/4 of an inch, and reaming holes to 1/2 inch with extremely critical dimensions on size and alignment. Without the BURGMASERS our costs to produce this part would have been almost prohibitive. Other equipment to fill the same need would have been much more expensive and much less versatile for our type production.

We have found the following qualities of the BURGMASTER to be of definite advantage in the manufacture of Ampex CinemaScope Sound Systems and Ampex Magnetic Tape Recorders. High Precision. Wide range of preselected speeds. Large adjustable work table. Low maintenance cost. Minimum time and effort required for set-up.

Visit our Booth 516, March 14-18, ASTE Western Exposition, Los Angeles, for preview of unique new metal working tools.

Write for Bulletin No. MM2

*T.M. Reg. U.S. Pat. Off.

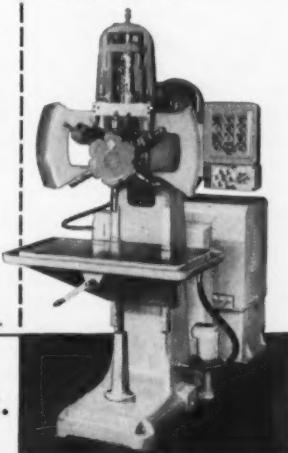


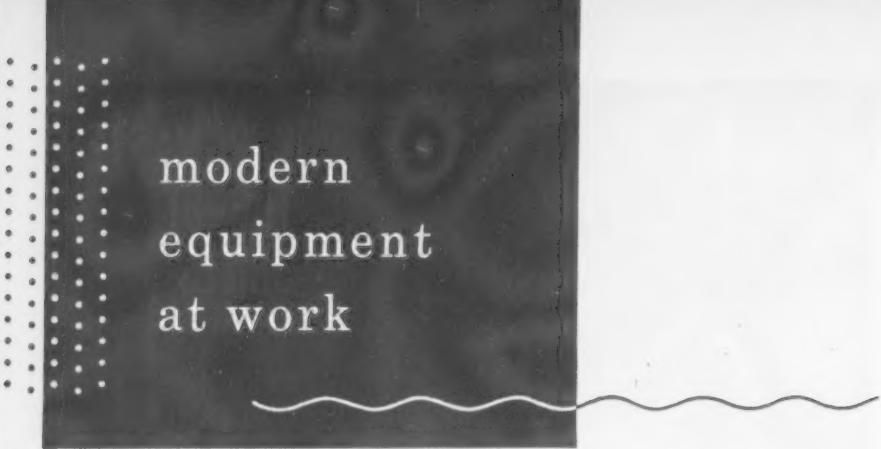
BURG TOOL
MANUFACTURING COMPANY INC.

P.O. BOX 48, GARDENA, CALIF.

BURGMASERS cut costs on drilling, tapping, threading, counterboring, countersinking, grooving, spot facing, form tooling, hollow milling, etc.

Available in 6 spindle manual; 6 and 8 spindle, hydraulic, automatic models. All BURGMASERS feature power indexing, pre-selective spindle speeds, very close pre-selective depth control.





modern equipment at work

Do It Yourself Applies to Tool Building Too

THE idea of "Do It Yourself" that has proved so highly successful on household projects is meeting with an equal amount of success in some quarters of the industrial field. Promoting the idea with considerable success in the metalworking field for example, is The Standard Electrical Tool Company, 2488 River Road, Cincinnati 4, Ohio. This company has made available a wide variety of dynamically balanced, direct or belted motor driven precision spindles that offer endless variations for application to both new and used machines. Standard also provides a variety of precision machine tool attachments such as feed and traverse units, tool grinders, and other units.

Machine Tool Attachments

The line of attachments for use in modernizing machine tools is designed to enable a present owner of a basic machine tool to economically make changes which will provide more and better production from the tool. Equally important, however, are the effective and economical uses of Standard

attachments on new machines. Many machine builders have discovered that The Standard Electrical Tool Company attachments are easy to adapt to the standard as well as the special tool.

Feed and Spindle Application

The application of a Standard precision feed and spindle to the special tube bending and cut-off machine shown in the accompanying illustration provides an excellent example of the method of incorporating Standard precision machine tool attachments into the construction of a special-design machine. This machine, as shown in the illustration, is equipped with a circular saw. This circular saw is attached to, and driven by means of, a Standard, precision built spindle, the spindle being mounted on a Standard vertical feed.

The tube bending and cut-off machine was designed and built by the Hautau Engineering Company, 721 Wanda, Ferndale 20, Michigan, for the Mueller Brass Company at Port Huron. It produces U-bends which are used as return connectors between parallel radiator tubes in refrigerator units. Twenty foot lengths of thinwall $\frac{3}{8}$ inch o.d. copper tubing are fed into

the machine and 3600 U-bends an hour are produced.

The machine is hydraulically actuated and is controlled by manually operated valves. By providing solenoid actuated, limit switch controlled hydraulic valves the machine may be readily converted to fully automatic operation so it may be used in timed sequences with other production machines.

Four lengths of tubing at a time are slipped over circular rod supports. The cycle begins when a cylinder actuated clamp grips the ends of the tubes nearest the machine and a second cylinder feeds the tubes onto a die half. A hydraulic motor then rotates the other die half through an arc of 180 degrees around the first die half forming the U-bends.

A circular saw on a vertical slide then lowers cutting the four bends off from the remaining lengths of tubing. The bends are removed from the die by a spring pressured clamp which is carried on the end of a pivoting arm. The arm is also actuated by means of a cylinder.

The complete cycle time of the machine is four seconds.

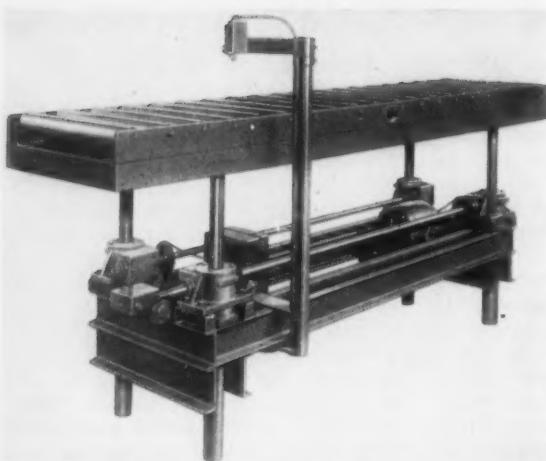
New tubing bending machine equipped with Standard Vertical Feed Unit on which a Standard Precision Spindle saw has been mounted.

Special Elevating Table Ups Production in Steel Mill

THE special elevating table illustrated herewith was designed by The Hamilton Tool Co., Hamilton, Ohio, for use in a steel mill to facilitate the handling of long sheets of steel being fed into a shear. Manual positioning of the sheets required the efforts of at least two men and at best was awkward and muscle straining, as well as time consuming. With this special Portelvator, one man is able to handle the long sheets with little or no effort. A push-button "start" and "stop" control and a gear driven limit switch provide the operator ease of control and operation.

The sheets of steel slide easily on the roller conveyor top which measures 28 x 120 in. and has a lift of 19





The special elevating table illustrated herewith was designed for use in a steel mill to facilitate handling of long sheets of steel being fed into a shear.

ity is 10,000 lb. The lift is powered by a 5 h.p. motor which motivates a meshed worm, worm gear and screw mechanism in each of the four corners of support. According to the manufacturer, neither mechanical failure nor power stoppage can cause the table to fall or "settle"; nor will an off center

load cause it to tip.

In this particular installation, the table has legs extended to fit into holes in the floor, thus providing extra depth for the lift supports. Where this ex-

in. from a minimum height of 27 in. to a maximum height of 46 inches. A rocker arm automatically maintains constant level of the table as the stack of sheets diminishes. The load capac-

GREENLEE HAND BENDER



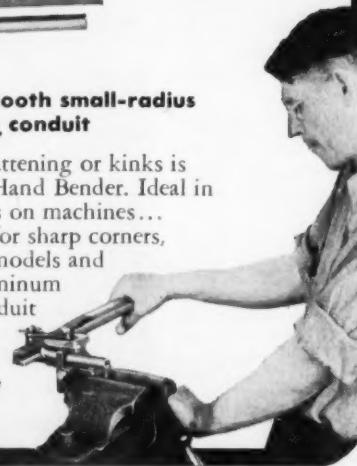
for quickly making smooth small-radius bends in pipe, tubing, conduit

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and

sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit



GET FREE FOLDER E-207 AND BOOKLET E-201. Complete facts and prices on the Greenlee Bender line. Write Greenlee Tool Company, 18 Herbert Avenue, Rockford, Illinois.



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Accuracy to plus or minus .0001". Unusually high load capacity up to 5200 lbs. at 50 RPM. Morse tapers 2, 3, 4 and 5.

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MULTI-DUTY

Interchangeable male, female and pipe points for centered and uncentered work. Nine sizes; Morse tapers 1 through 5, as well as straight. Loads to 1500 lbs. at 100 RPM.

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For close tolerance turning jobs to 22,000 lbs. at 50 RPM. Eccentricity less than .0002". Morse tapers 4, 5, 6 and 7.

Standardize on IDEAL Live Centers and meet practically any live center need right from distributor stocks! You'll simplify stocking, reduce inventory investment. Get top performance, too, as proved by the hundreds of plants where IDEAL Live Centers are *first choice* for unsurpassed quantity and quality of output—on *all* kinds of jobs. See your IDEAL Distributor or mail the coupon.

NEW PIPE POINT LIVE CENTER

For heavy turning work on pipes and other large, hollow cylinders. Sizes range from 3" diam. to 7½" diam. Load capacities up to 22,000 lbs. Morse tapers 3, 4, 5, 6 and 7.

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1031 Park Avenue, Sycamore, Illinois



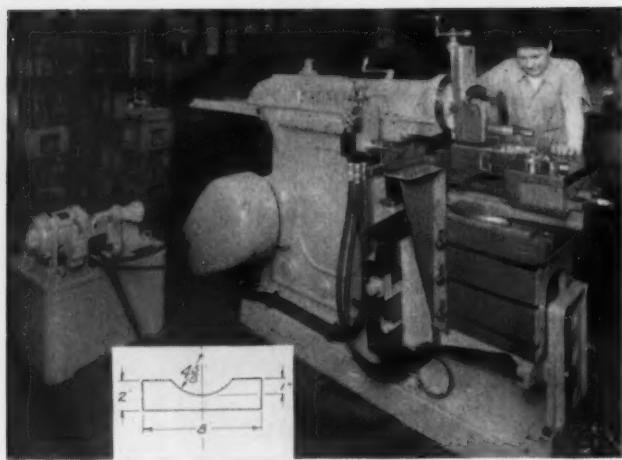
Please send free catalog data on IDEAL Live Centers

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Company.....

Address.....

City..... Zone..... State.....



This follower-equipped metalworking shaper, installed in the Buffalo plant of Ernst Iron Works, has reduced operation time for machining bridge bearing plates from 75 to 28 minutes.

tra depth is not required, the Portel-vator may be anchored to the floor by other means, or in some cases may be merely placed in position.

* * *

Follower-Equipped Shaper Reduces Machining Time on Bridge Bearing Plates

THE operation time for machining bridge bearing plates in quantity has been reduced from 75 minutes to 20 minutes by the application of a follower-equipped metalworking shaper at the Buffalo Plant of Ernst Iron Works, which produces many of the

bridges and general construction components for the highway turnpikes rapidly spanning our country. This machine, as illustrated here-with, is a 24-in. heavy duty Cincinnati shaper, equipped with a Turchan automatic follower. In one 20-minute floor-to-floor operation, this shaper accurately produces a radial bearing seat that formerly required two set-ups and two machining operations.

* * *

Carbide-Tipped Centers Solve Regrinding Problem

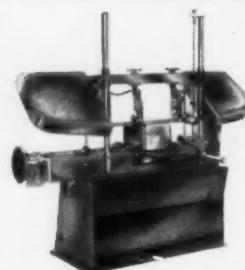
THE Producto Machine Co., Bridgeport, Conn., die set manufacturer, reduced its center regrinding operations on a mass production grinding operation from over 40 to a maximum of 4 regrinds a year by switching to

INTRODUCING 2 NEW MODELS Variable Speed Drive—Full Hydraulic Operation . . .

- Provides speeds from 50 to 290 f.p.m. Combined with a graduated metering valve on our fully hydraulic models, this feature permits choice of proper blade speed and pressure for maximum production and blade life from high speed or high carbon steel blades.
- MODELS W and F—9" x 18" and 14" x 18" capacity, respectively, feature full hydraulic operation. All welded steel base—

more rigid for heavier cutting. Welded, one-piece cutting head for swifter blade changes and easier chip removal. Larger capacity coolant and chip tray. Automatic bar feed available to reduce operator's time to a minimum.

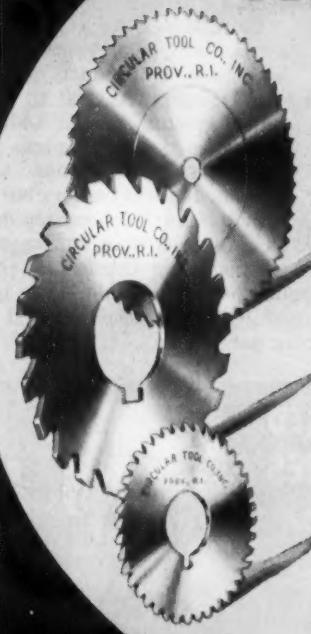
W. F. WELLS & SONS
THREE RIVERS, MICHIGAN



On metal-cutting problems

consult these

CIRCLE R specialists



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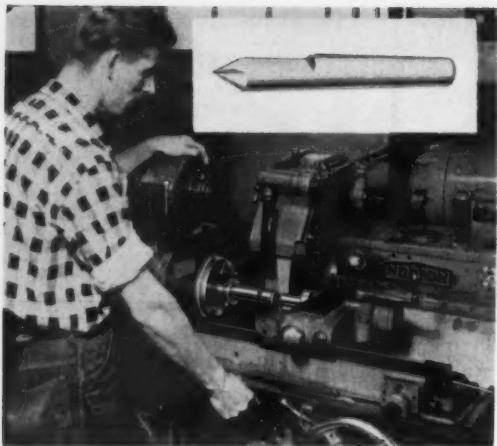
For all production, including complex automation, we make the finest circular metal-cutting tools—but they cost no more.

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METAL SLITTING SAWS
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ERSINKS • CENTER REAMERS



Machining die set guide pin on a grinder equipped with carbide-tipped centers of the type shown in the inset

x 3-in. wheel at 1,100 r.p.m. The rough grind removes approximately 0.015 to 0.020 in. and the finish grind, 0.001 to 0.002 inch.

Using 1 x 6-in. guide pins as an example, a typical nine-hour day's production for each machine is 200 to 300 rough ground pins or 450 to 550 finished ground pins. At this rate of production, the previously used centers burned up so quickly that each center had to be reground more than 40 times a year. After installing the Red-E carbide-tipped centers throughout the department, regrinds were reduced to six a year per center.

Red-E carbide-tipped centers manufactured by Ready Tool Co., also of Bridgeport. The machining operation consists of rough and finish grinding Producto die set precision guide pins on Norton 6 x 30 grinders, using a 20

ed up so quickly that each center had to be reground more than 40 times a year. After installing the Red-E carbide-tipped centers throughout the department, regrinds were reduced to six a year per center.



INDUCTION HARDENED PRESS BRAKE DIES

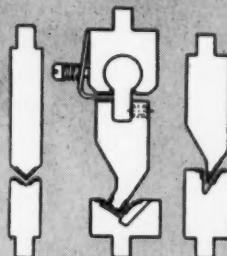
**for greater die life at no extra cost
on any make of press brake**

Whether it is a simple die for angle bending or the more complex dies for any of the combined bending and forming operations, CHICAGO induction-hardened dies offer bonus performance at no extra cost. Field reports on these dies show better than ten times the useful life of the conventional dies used in press brakes. Get the full particulars on CHICAGO dies for your next press brake job.

2015 Steel Bending Brakes for over 50 Years

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MANUFACTURING COMPANY

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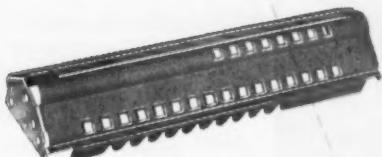
Heavy lines
indicate
hardened surfaces



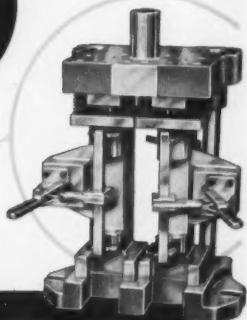
STEEL BENDING BRAKES
BOX AND PAN BRAKES
PRESS BRAKES

PRODUCTO Catalog DIE SETS

SOLVE SPECIAL STAMPING
PROBLEM FOR MONROE



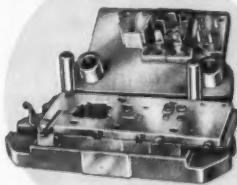
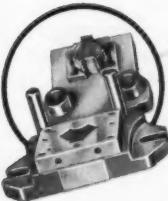
The Problem:
Stamping end-hole in
the carriage cover of the
Monroe Adding Calculator.



PRECISION

PRODUCTO

new design DIE SETS



THE DIE MANUFACTURER:
The Connector Tool
and Engineering Co.,
Bridgeport, Conn.

The lofty die, at right, represents the last critical stamping operation in the production of the Monroe carriage cover, shown above. It's unusual because it pierces close-tolerance end holes in either 10" or 12" covers after they have been assembled. The die set that controls this precise piercing operation both looks and performs like a "special" made-to-order set. Actually, it is a rear pin catalog set fitted with $1\frac{1}{4}$ " x 16" pins. Even with the long guide pins, the highly accurate parallelism is maintained. Yes, Monroe is getting the benefit of a "special" without paying for extras in time and expense.

In all, 12 Producto catalog die sets are used in stamping and forming this assembly. Only the one with the long guide pins is unusual in size or shape but all require the utmost in precision and dependability. The point to remember is this: Whether you require a "made-to-order" special or a "quick-to-order" catalog die set, you'll get the best from Producto.

FOR PRECISION DIE SETS FAST CALL...

THE PRODUCTO MACHINE COMPANY • 910 Housatonic Ave., Bridgeport 1, Conn.
ALSO MAKERS OF DIE ACCESSORIES, FEEDING EQUIPMENT, VISES, MACHINERY.





Operator in the plant of O. K. Rubber, Inc., is shown tapping holes in 1½-inch thick steel plate using a radial drill equipped with Norgren Spray-Lube system.

Hole Tapping Operation Improved Through Use of New Cooling and Lubricating System

AT O. K. Rubber, Inc., Manufacturing Division, Machine Shop, Littletown, Colo., the application of a Norgren Spray-Lube system to a Carlton radial drill is said to have doubled tap

life, increased tap speed 38 per cent and improved tapped hole quality in tapping holes in 1½-inch thick plate of 8620 steel (nickel-chromium-molybdenum alloy). With the previously used method of cooling and lubricating the tap, breakage and wear destroyed four ¾-inch taps during the process of tapping 600 holes in 1½-inch thick alloy steel plate at a speed of 265 r.p.m. Thus, the average life of a tap on this job was only 150 holes.

With the present method, a Norgren Spray-Lube system is used on the machine, with the control and supply equipment connected to the mixing valve by 12 feet of ¾-inch o.d. copper tubing. The mixing valve is mounted on the machine within easy reach of the operator to facilitate adjustment of the spray discharge. Five feet of ¾-inch i.d. hose conveys the spray

LUERS

PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by

J. MILTON LUERS, 12 Pine Street, Mt. Clemens, Mich.

Produced under License Issued by John Milton Luers Patents Inc.

Cooley ELECTRIC HEAT TREATING FURNACES

31 MODELS—A Complete Source of Small Heat Treating Furnaces

Cooley Heat Treating Furnaces are used for heat treating operations from 300° F. to 2500° F.

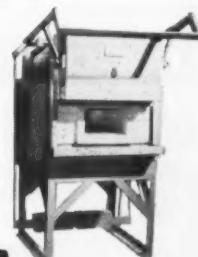
A special Cooley feature is a package unit comprised of furnace and integrally wired control panel, incorporating pyrometer, line switch and fuses—all completely factory wired.

Indicating controlling Pyrometers are available with all Cooley Furnaces.

Bench Type — For tools and small parts — to 2000° F 14 models and sizes to 10" w x 8" h x 18" d.



Industrial Box Furnace — General heat treating — to 2000° F 4 models and sizes to 15" w x 12" h x 30" d.



Recirculating Air Draw — Box type for controlled heating to 1250° F — steel tempering, glass annealing, etc. 5 models — sizes to 24" w x 15" h x 48" d.



Recirculating Ovens — for drying, finishing and industrial processing to 600° F—5 models and sizes to 36" w x 36" d x 60" h.

Write for Catalog and Complete Details



ELECTRIC MFG. CORP.

34 SOUTH SHELBY STREET
INDIANAPOLIS 7, INDIANA

from the mixing valve to a single nozzle which directs the spray at the tap and in the hole.

Pressure on the air line is set at 60 p.s.i., while the pressure on the liquid line is set at 62 p.s.i. The cutting liquid is Dypral Safety Coolant mixed 25 parts of water to 1 part of coolant.

The following paragraph provides a comparison of the results of the Spray-Lube system over the method used previously on the operation mentioned above. Using a larger tap and working the same 1½-inch thick alloy steel plate, 300 ½-inch size holes were tapped without changing the tap. After 300 holes, the tap showed only slightly perceptible signs of wear. At the end of the run the tap had already turned out twice as much work as the average of the four taps used previously and was claimed to be still as good as new. The speed of the tap was increased nearly 38 per cent—from 265 to 365 r.p.m. The quality of the tapped hole was substantially improved.

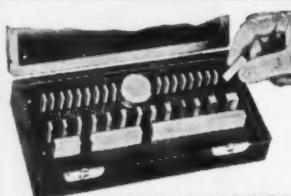
Production Turning of Tank Components

FOR the production turning of heavy duty tank transmission parts at a plant of one of the major automotive companies five Model HD-24 automatic lathes built by Hydra-Feed Machine Tool Corp., Ferndale, Mich., were toolled up to perform the series of turning operations. The tank transmission parts are turned from rolled and welded S.A.E. 8740 rings. All cuts are taken at approximately 360-420 surface feet per minute.

During the first turning operation, two carbide tools mounted on the top carriage rough bore the inside diameter of the ring. At the same time, two more tools on the rear carriage are facing and counterboring one side of the ring. Because all tools rapid advance on the lathes, cycle time in this operation, as in all others, is held to a minimum.

At lathe No. 2, the ring is turned

ULTRA-CHEX GAGE BLOCKS for Every Need!



IMMEDIATE DELIVERY

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5 MILLIONTHS ± ACCURACY

34 BLOCK SET.....\$125.00
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In Case

9 BLOCK SET
FOR INDIVIDUAL
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"Lustro-Chrome" MICROMETER

Take the GLARE out of Micrometer
Reading with the New

"Lustro-Chrome"
MICROMETER

MEASURE TO
1/10,000th

Ask for Micrometer
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All graduations are well-defined black lines on dull chrome surface for easier and surer reading, even in poor light. Guaranteed accurate within one half of a ten thousandth of an inch.

No. 901C
0-1" Size with LOCK NUT
and RATCHET and
10th Vernier
as shown.....\$13.25
Code GHAEF

This tool with TUNGSTEN CARBIDE tipped anvils.....\$15.75
Code GHAEF-CA

Drop-forged model with chrome finished micrometer head from
\$8.25 up.

GEORGE SCHERR CO., Inc.

200-MM LAFAYETTE ST. NEW YORK 12, N.Y.

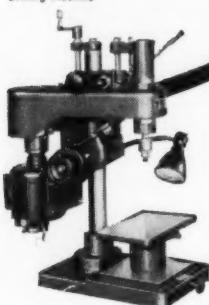
precision product?

5408

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HOLES ARE
IMPERATIVE!



HAMILTON VARIMATIC®
Super Sensitive
Variable Speed
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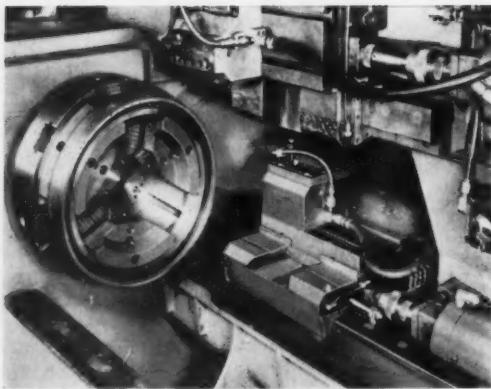
Are you fighting the never-ending battle of trying to produce exact holes on a drilling machine which, itself, is not built to precision tolerances? You are under no necessity to do so. For the difference in price between the cheapest bench type, small hole drilling machine and the Hamilton Varimatic is reckoned in pennies per day. And the Hamilton Varimatic (holes from .004" to $\frac{3}{16}$ " in all drillable materials) is super sensitive. Provides speeds, infinitely variable, between 840 R.P.M. and 9300 R.P.M. Is built to precision tolerances, and with the stamina to retain precision.

Get prices and specifications without obligation

ASK FOR **FREE BULLETIN 5408**

Address The Hamilton Tool Company
828 South Ninth Street
Hamilton, Ohio

IT'S A
Hamilton Tool
USE IT WITH CONFIDENCE



Close-up view of tank transmission ring at completion of cutting 1-in.-wide x 2½-in. deep groove on Hydra-Feed Model HD-24 lathe. Tool on top carriage is ½-in. and rear carriage tool is ¼-inch. Cycle time is approximately 3 minutes.

over and clamped internally to turn the o.d. and to face and counterbore the second side. A single tool is used in the top carriage, while two tools are mounted in the rear carriage.

Roughing a 1-in. wide groove is the third operation. In this operation, the ring is again turned over and the 2½-in. deep groove is cut at a 0.015-in. feed using a ¾-in. tool on the rear carriage and a ½-in. tool on the top carriage.

Finish turning begins on the fourth machine where the top carriage finish bores the inside diameter and finish turns a step in the outside of the groove. The rear carriage uses two tools to finish face two surfaces on one side of the ring.

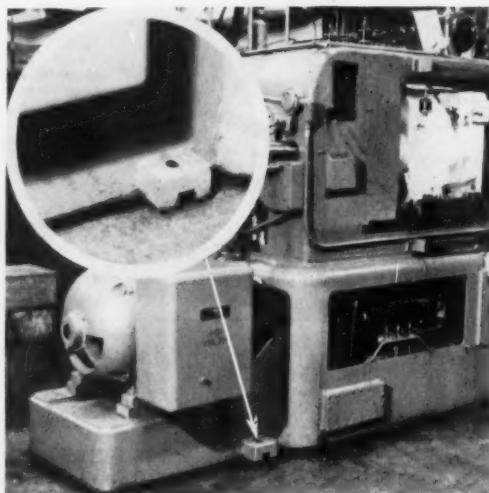
In the final operation a platen is used in addition to the top and rear carriages. The platen tool is used to counterbore on the inside diameter of the groove while the top carriage tools finish

turn the o.d., and the tool on the rear carriage finish turns the groove. This latter operation again makes use of the longitudinally feeding rear carriage.

★ ★ ★

Production Machines at Sheaffer Pen Installed on Vibration-Reducing Pads

MANY types of production machines in W. A. Sheaffer Pen Company's new 3½-million-dollar plant at Ft. Madison, Iowa, were installed without floor drilling for bolts or screws by using "Unisorb" pads made by The Felters Co., Boston, Mass. Weighing about 10 tons, the



Unisorb-pad-mounted molding machine installed in Sheaffer Pen Company's new Ft. Madison, Iowa plant

NOW CUT COST OF PRECISION GEAR PRODUCTION

5410

THIS FEATURE: "Independent selection of speed, feed and indexing," sets the Hamilton Precision Small Gear Hobber apart from the field,

AND ENABLES the users of this machine to vary speed and feed to suit the material being machined.

THIS FACT, and a "reserve of accuracy" built into the machine, work spindle and hob spindle runout of less than .0002" as an example,

CONTRIBUTES to more gear precision with no sacrifice of gear production,

OR INCREASED gear production with no sacrifice of gear precision,
.....
OR BOTH!

Prices and specifications without obligation

ASK FOR FREE BULLETIN 5410

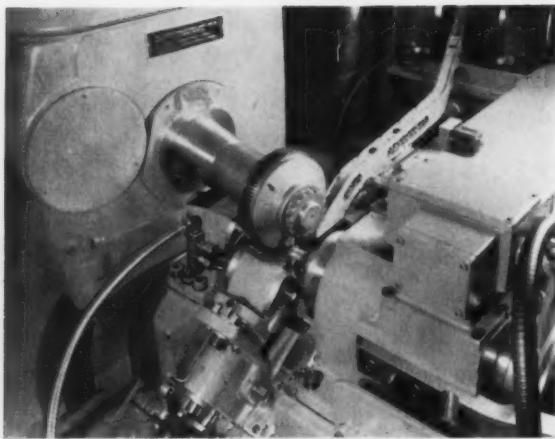
Address

The Hamilton Tool Company
828 South Ninth Street
Hamilton, Ohio



IT'S A

Hamilton Tool
USE IT WITH CONFIDENCE



Close-up view of setup in which the tips of the teeth of automotive pinions are accurately chamfered at the same time the teeth are being shaved.

Lester-Phoenix molding machine illustrated herewith is one of the many machines installed on Unisorb pads, which eliminate the need for floor drilling and reduce transmitted vibration and noise. In installing the machines, Unisorb cement was used to hold the pads to the machine bases and the floor.

★ ★ ★

Chamfering and Shaving Automotive Pinions Automatically

ACCURATELY controlled chamfering of the tips of the teeth of automotive pinions at the same time the teeth are being shaved is accomplished by a process developed by The Fellows Gear Shaper Co., Springfield, Vt. The basic machine is a No. 8 Fellows "Full-tool" Gear Shaving Machine tooled for fully automatic operation. Two tools are employed, a shaving tool and a rotary serrated-tooth chamfering tool which is located on a movable slide below and at the left of the shaving tool. An air cylinder automatically advances and withdraws the chamfering tool slide in timed relation with

the shaving cycle of the machine. In production, the pinions roll down a chute from an automatic feeding device and drop, one at a time, into a carrier. An air cylinder moves the carrier to the position where the

pinion is loaded on the work arbor. When this point is reached, a microswitch operates another air cylinder, bringing the work arbor forward through the hole in the pinion to locate and clamp it for shaving and chamfering. The carrier is then drawn back to receive the next pinion.

As soon as the carrier is back in its starting position, the shaving tool starts to rotate; the depth feed cam on the machine raises the pinion to the previously set center distance for shaving; and the chamfering tool slide is advanced to bring this tool to its preset center distance with the work. The chamfering tool is wider than the pinion and is not traversed.

After the first pass of the shaving tool across the pinion, the chamfering tool is withdrawn from the work and the direction of shaving tool rotation reversed for the second pass across the pinion. As soon as the second pass is completed, a recess in the depth feed cam allows the pinion to drop slightly from the shaving center distance, the arbor is withdrawn and the pinion ejected into the unloading chute. Another pinion is then loaded and the sequence of operations repeated.

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WASTE MONEY
RISK ACCIDENT
doing things the
HARD WAY?**

Take a trip through your plant today and note how

many assembly and maintenance operations are being done in awkward or tiresome positions.



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THEM BEING DONE ON
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THE HANDY HAMILTON PORTABLE ELEVATING TABLE

With Portelvator hundreds of assembly and maintenance jobs are accomplished at the right height and in the best light.

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...THEN TRY **ATKINS SilverSteel®**

- Oil hardening, electric furnace tool steel made to rigid specifications—latest metallurgical development.
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- Hardens deeply with closely refined grain structure—unusually tough!
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Use for dies in operations such as: Blanking • Trimming • Punching • Forming • Piercing • Perforating • Embossing . . . any work that demands accuracy. Cutting and finishing non-ferrous metals—particularly brass and bronze.

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If you have the problem of precision boring deep, *small holes* you'll get maximum results if you come to Bokum. You'll save because you'll be able to hold to exceptionally close tolerances—complete the boring operation often in one pass rather than several.

And you'll save with extra-long tool life, too. Shanks are made of a tough grade carbide for maximum strength and rigidity. Clearance is retained throughout the life of the tool, the shape of the cross section remains constant, and resharpening is required on the top face only. Tools are furnished in two of the highest grade materials recognized for wear resistance. TC-4 for boring cast iron and non-ferrous materials and TC-8 for finish boring of steel.

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news of the industry

Arthur H. Starrett Honored with Lafayette Leadership Award

Arthur H. Starrett, president of The L. S. Starrett Co., Athol, Mass., recently joined a select group of distinguished Americans when he was tapped with the Lafayette Leadership Baton. The traditional ceremony was performed in Athol at a special meeting of the Rotary Club during which Mr. Starrett was named 15th on a list of distinguished citizens honored for "devotional duty to country and community." Frederic Colyer Snyder, chairman of the Lafayette Leadership Baton Committee, Newburgh, New York Chapter, Empire State Society, Sons of American Revolution, con-

ferred the baton-tapping as a symbol of membership in the national chapter. Mr. Starrett was nominated for the honor by the Rotary Club.

The baton used in the ceremony was made from an oak beam from the headquarters of General Washington at Newburgh, which was also occupied by the Marquis de Lafayette during the Revolution. It is inscribed with the flag of the United States and the French tricolor and is a symbol of Lafayette's dedication to freedom and service to his fellow men. The award is conferred on outstanding citizens who exemplify Lafayette's ideals. Others who have received the award recently are Fritz Kreisler, violinist,



Baton tapping ceremony in recognition of the work of Arthur H. Starrett, president of The L. S. Starrett Company. Left to right, William E. Nickerson and William G. Lord, past presidents, Athol Rotary Club; Frederic Colyer Snyder, Lafayette Baton Committee; Mr. Starrett; and William E. Nemo, past president, Athol Rotary Club.

and Jacqueline Cochran, aviatrix. The award was conferred on Mr. Starrett in recognition of his "creative citizenship" as the president of the Athol precision tool manufacturing concern and as a leader in his community.

★ ★ ★

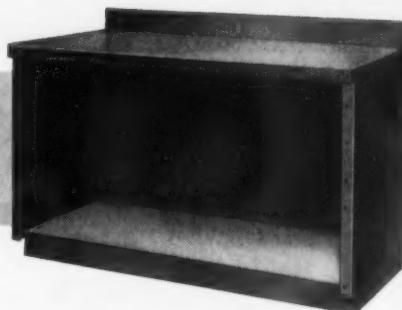
Valenite Metals Builds Plant to Produce Tungsten Carbide

The release of Valenite tungsten carbide tips and tools to the market in general has been announced by Valenite Metals Corp., Royal Oak, Mich. The company has actually been in production for some time, but its products have been issued only to a limited group of users for production test purposes. A new plant has been built in Royal Oak to house the activities of the new company. Productive processes are based on improved vacuum sintering techniques. Hydrogen atmosphere operations are also used where applicable. The new plant has a completely-equipped laboratory for quality control based on metallographic techniques. Sintering is performed electronically. The fur-

naces are encased by induction coils exceeding two feet in diameter.

The entire plant building is sealed against intrusion of outside dust. In addition, the interior is divided into separate sealed rooms. Air for these rooms is drawn from the plant interior and is forced into them after passing through double banks of filters. A positive pressure is maintained in the rooms to exclude dust. Unsintered carbide is exposed only in these rooms.

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HALLOWELL FEATURES

3 lengths, 4 heights, 4 widths—all standard

4 top materials—steel, Preswood on steel, ShopTop, laminated wood

Functional design, neat appearance, plenty of protected storage space

Use them as single units or continuous benches of any length

Standard units with *standard* accessories permit you to *custom build* Hallowell Cabinet Benches to fit your requirements. Stocked by leading shop equipment dealers. Write for literature. STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

HALLOWELL SHOP EQUIPMENT DIVISION

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JENKINTOWN PENNSYLVANIA

(Left to right) Frank G. East,
George N. Levesque and
Henry R. Westcott



A.S.M.E. Announces 1954 Machine Tool Awards

At its annual meeting held recently in the ballroom of the Hotel Statler,

New York City, the American Society of Mechanical Engineers announced that George N. Levesque, director of research, Brown & Sharpe Mfg. Co., Providence, R. I., and Frank G. East, vice president and general manager, Hamilton Machine and Gear Co., Toronto, Canada, were chosen as winners of the 1954 Machine Tool Awards. Henry R. Westcott, chairman of the A.S.M.E.'s Board of Honors, conferred the awards. Mr. Levesque received the first award of \$100 for his



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DUAL SPEED DRILL PRESS TURRET
DRILLS, REAMS, TAPS ON 1 DRILL PRESS SPINDLE!

- Fits Any Drill Press • Increases Production
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Commander Select-A-Spindle permits you to do 3 operations on a single drill press spindle . . . save time . . . eliminate multiple handling of piece parts, speed production and reduce overall costs. Dual Speed Select-A-Spindle permits selection of proper speed for each operation. Quick, positive hand indexing positions each tool accurately for sequence operations. Select-A-Spindle is built to tap with any 1, 2, or all 3 spindles to the full capacity of the unit. Adjustable torque control spindles for protection of taps to $\frac{1}{4}$ " available.

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**MAKE
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WITH
Ames
PORTABLE
HARDNESS TESTERS



Ames Portable Tester making hardness test on large casting while being machined.

You can get accurate, dependable tests anywhere, anytime, with Ames Portable Hardness Testers. No delays, no waiting for laboratory tests, no cutting off specimens. Any-one can operate.

Ames Testers are light in weight — may be taken to the work — read directly in the Rockwell Scales. Are made in sizes from 1" to 8" capacity for testing rounds, flats, sheet stock, tubing, odd shaped pieces and assembled parts.

Look into this time-saving, inexpensive method of making your hardness tests today. Thousands in every day use. Send for folder "Rockwell Hardness Testing Made Easy".

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AMES PRECISION MACHINE WORKS

Makers of Ames Precision Lathes and Bench Millers
WALTHAM 54, MASSACHUSETTS

paper which is entitled "Testing Methods for Production of Accurate Machine Slideways."

★ ★ ★

"Tooling for Western Industrial Expansion" Theme for A.S.T.E. Western Industrial Exposition

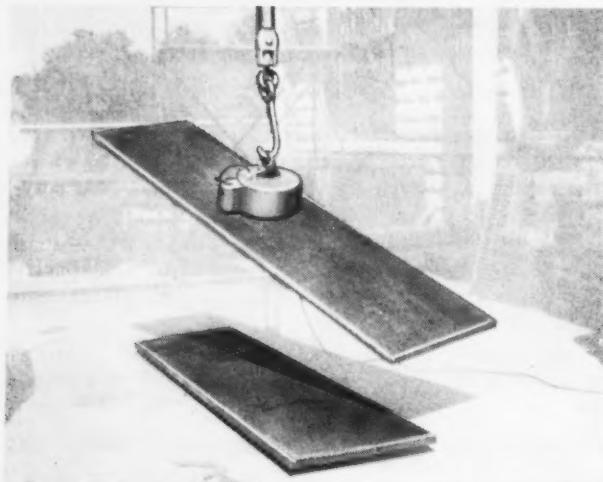
"Tooling for Western Industrial Expansion" is the theme for the first A.S.T.E. Western Industrial Exposition to be held in Los Angeles' Shrine

Auditorium and Convention Hall, March 14-18, 1955.

In making the announcement of the theme for the exposition, Harry E. Conrad, executive secretary of the 30,000-member and 121-chapter American Society of Tool Engineers said: "Importance of the western industrial market is pointed up by the continuing surge of expansion that shows no indication of a let-up. This tremendous expansion creates an equally great need for the latest developments in production machines and processes. Our show will enable western industrial executives and engineers to see these developments in one location. Both the exposition and the A.S.T.E. annual meeting, to be held concurrently, are keyed to the production problems of western industry's growth."

The more than 270 companies which will exhibit products in the first A.S.T.E. Western Industrial Exposition are keying their exhibits to the needs of western industry. Exhibitors in the show will display machines, tools and processes best suited to meet the demands of western industry.

Walker Does It Again --



WALKER LITTLE GIANT—the most powerful lifting magnet yet designed will lift 1000 pounds, utilizing less energy than the ordinary 150-watt kitchen lamp . . . can be designed for all voltages from a 6-volt car battery to 220-volt DC power line . . . practical for electric powered trucks and lifts.

O. S. WALKER CO., INC.
WORCESTER 6, MASSACHUSETTS
Original Designers and Builders of Magnetic Chucks

**INCREASES
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LOWERS COSTS...

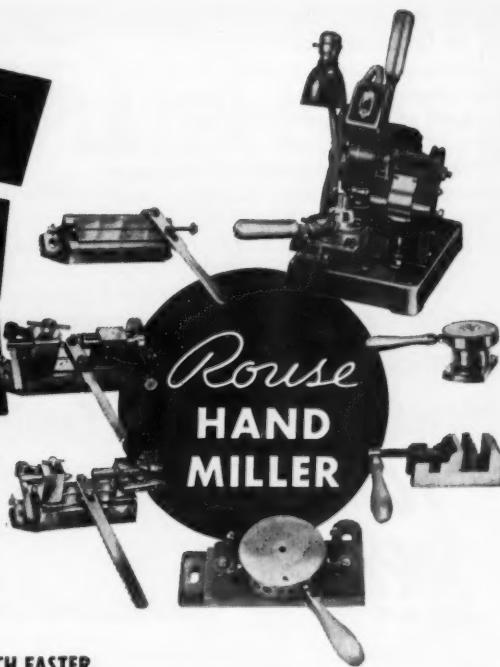
**PAYS FOR ITSELF
QUICKLY...**

The ROUSE HAND MILLER is a widely used, inexpensive, high speed, ball bearing, motor driven machine for handling light cuts in brass, aluminum, steel, plastics, and other materials—fast, accurately, and at very low cost. Only \$110.00*

Fixtures (illustrated) extra.

Motor equipment:— $\frac{1}{4}$ H.P., 110 Volt AC 60 cycle, single phase, swivel motor mount and light—\$36.00*

*All prices FOB Chicago.



- ★ MILLS SMALL PARTS MUCH FASTER.
- ★ DRASTICALLY CUTS YOUR INVESTMENT IN EQUIPMENT. Replaces expensive production machinery—or releases it for other jobs.
- ★ INEXPERIENCED HELP CAN OPERATE IT. Safe, simple, fool-proof operation.
- ★ NO MORE COSTLY SET-UP TIME. \$110.00* price so low that it pays to keep one or more Hand Millers always set-up for special operations.
- ★ YOU GET A BETTER PRODUCT—the result of ABSOLUTE ACCURACY.
- ★ A LOSS BECOMES A PROFIT when marginal pieces are finished on the Hand Miller instead of on high cost equipment.
- ★ VERY LOW MAINTENANCE.
- ★ USED REGULARLY IN 1163 MANUFACTURING PLANTS (some of which use as many as 30 machines)—yet on the market a scant few years.
- ★ UNIQUE—VERSATILE. Nothing else like it. One or several machines can be the answer to some of your production problems.

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Write today
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G. N. Popham Elected President of Gorham Tool Company

Gorham Tool Co., Detroit, Mich., has announced the election of George N. Popham as president and general manager of the company. Mr. Popham, who served as vice president and sales manager for the past 13 years, succeeds Don T. Flater who has resigned his position to devote full time to his other business interests. Mr. Popham has been an active member of the cut-

ting tool industry for the past 25 years. He is a member of the American Society of Tool Engineers, the Engineering Society of Detroit and the Detroit Sales Executive Club.

* * *

Second International Automation Exposition

The potentialities of automation can be studied at close range at the Second International Automation Exposition

to be held November 14 to 17, 1955, in the Chicago Navy Pier, Chicago, Ill. Automatic production has developed far beyond application to single pieces of equipment. The equipment on display will permit a consideration of the possibilities of applying automatic production to plant and laboratory operations. Modern civilization is changing as new advances are made in automation. As these advances are proceeding rapidly, it is important that the latest developments be placed before industrial executives, engineers and research men.

The Second International Automation Exposition is designed to provide

a FULLER BRUSH product

New Time-Saver for Engineers

**YOURS
FREE**



Handy Fuller Slide Chart of Wheel
Brush Specifications

Wheel brush selection with a flip of the wrist. No catalog searching . . . no comeback from "Purchasing" . . . You can even give them the stock numbers of:



FULLANCHOR Super-Balance WHEEL BRUSHES

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THE FULLER BRUSH COMPANY
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a FULLER BRUSH product

this
RODGERS PLATEN PRESS
produces
GRIDDLES
at a sizzling rate!



Ever since they changed from a mechanical press to a Rodgers 100 ton Hydraulic Platen Press, Northland Aluminum Products of Minneapolis has reported they are not only pleased, but also surprised at the unusual results. No wonder! . . . production is up . . . product quality and finish is better . . . die wear is reduced . . . and die setup time is less. All these advantages are vitally important to Northland for they make a variety of products like Nordic Ware Aluminum Utensils, Griddle King Griddles and Steak Platters.

Although you may produce an entirely different line of products you probably would find a Standard Rodgers Platen Press would offer you the same advantages . . . whether your jobs are stamping, forming, drawing, coining, or die try-out . . . in metal or plastics.

*Write for the new Illustrated
Rodgers Blue Ribbon Catalog*

it gives complete details and specifications

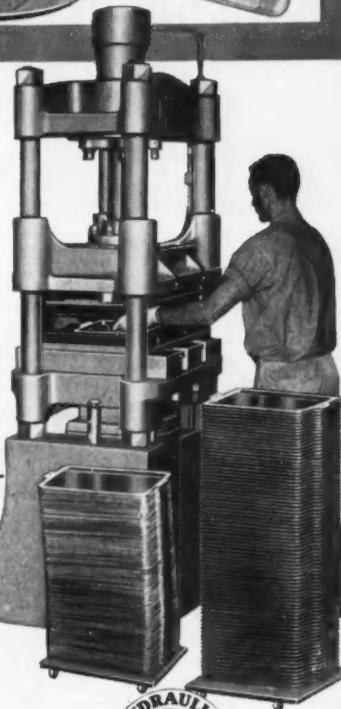


**RODGERS BLUE RIBBON
PLATEN PRESSES FOR:**

- Metal Drawing and Forming
- Plastic and Rubber Molding
- Die Try-Out General Assembly and Utility Work
- Capacities from 10 to 500 tons pressure



Here is the Rodgers 100 ton Hydraulic 24"x24" Platen Press which blanks and forms Northland Griddle Kings at the rate of 8 per minute. Aluminum is .153—finished size is 10 $\frac{1}{4}$ " x 17 $\frac{1}{2}$ ".



Rodgers Hydraulic Inc.

7447 Walker St., Minneapolis 16, Minn.

the most important opportunity for manufacturers of instruments and devices for measurement, analysis, inspection, testing, computing and automatic control to display their latest advances to those responsible for future research and production methods. Copies of the floor plan can be obtained from the Exhibit Director of the Second International Automation Exposition, 845 Ridge Ave., Pittsburgh 12, Pennsylvania.

Omer E. Robbins Named Ex-Cell-O Director

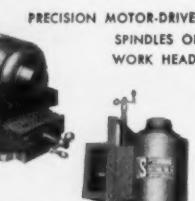
Following a recent meeting of the board of directors of Ex-Cell-O Corp., Detroit, Mich., H. G. Bixby, president, announced the election of Omer E. Robbins as a director to fill the vacancy on the board created by the death of Leslie M. Johnston of Pittsburgh. Mr. Johnston had served as a member of the board since 1931. Mr. Robbins organized The Robbins Engineering Company in 1929. The company first designed and manufactured tooling for automotive parts;

STANDARD has a spindle for every purpose!



STANDARD spindle users are a "Who's Who" of American metal working... here's the perfect answer to modernizing old machines... developing special combinations with regular spindles.

PRECISION MOTOR-DRIVEN SPINDLES OR WORK HEADS



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- ★ DYNAMICALLY BALANCED
- ★ PRECISION ENGINEERED
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SPECIAL PROBLEMS?

Tell us about them... WE'LL DESIGN A SPINDLE FOR YOU... we take great pride in our reputation for custom engineering in the spindle field.

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PRECISION SPINDLES AND MACHINE TOOLS

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Omer E. Robbins

then during World War II, the firm switched to development and production work on jet aircraft engine parts. Robbins Engineering was acquired by Ex-Cell-O Corporation in 1948, and Mr. Robbins continued as its president until early in 1951 when he retired from active duty.



**Standard machine equipped
with a standard vertical
bracket**

Any number of drilling units up to eight may be employed, the units being movable not only through 360 degrees on the circular table but also movable endwise on riser plates to meet the requirements of the part being drilled.

The machine may also be used for tapping operations with Govro-Nelson Tapping Units. It has a range of $1/32''$ to $3/8''$ on drilling operations and 0-80 to 3/8-16 on tapping operations, depending on material and spindle speeds. A single, momentary contact start-button causes all units to operate simultaneously.

If you are interested in reducing the cost of your radial drilling and tapping operations, write for price and dimensional data.

7 HOLES AT ONCE WITH A STANDARD RADIAL HOLE DRILLING MACHINE

Why build a special machine for drilling radial holes when a standard machine equipped with Govro-Nelson Automatic Drilling Units will, in many cases, perform the work of a special machine that would cost considerably more!

**WRITE FOR
Literature**

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Machinists of Precision Parts for 32 Years
1933 Antoinette
Detroit 8, Mich.

Automatic DRILLING UNIT



Wash drawing of new gray iron foundry of The Bullard Co.,
Bridgeport, Connecticut

Bullard Builds New Gray Iron Foundry

The Bullard Co., Bridgeport, Conn., has announced the construction of a new gray iron foundry which, including equipment, will cost approximately \$6,000,000. The foundry will be located parallel to the south side of the New Haven Railroad right-of-way and west of Brewster Street and will be 600 feet in length, 245 feet wide and

about 50 feet high. The foundry will embody the latest developments in dust and smoke control, materials handling and other equipment. New equipment installed recently in the company's present foundry will be transferred to the new plant, and the present foundry building will provide needed space for other company operations.

Included in the new foundry plans is



Profit BY CHANGING TOOL HOLDERS !

On tapping and reaming jobs it will be to your advantage to change over to Ziegler Floating Tool Holders for making set-ups because of the time and labor that the Ziegler Holder saves. This advantage becomes obvious when you consider that with a Ziegler Holder the work need not be perfectly aligned with the spindle — but only within $1/32"$ on the radius or $1/16"$ on the diameter. The Ziegler Holder automatically compensates for the difference.

Simplify your set-up jobs by using Ziegler Floating Tool Holders. They're time-savers and money-savers.

Prompt Delivery

W. M. ZIEGLER TOOL CO.

Ziegler
ROLLER
DRIVE

FLOATING HOLDER
for Taps and Reamers...

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Get the advantages of magnetic chucking

FOR BENCH WORK,

FOR SMALL

MACHINE

TOOLS



Magna-Lock electro-magnetic CHUCKS

These small chucks — 5" x 10", 6" x 12", 6" x 18", 10" x 15" working surfaces — eliminate costly fixtures, give you all the features of the larger Magna-Locks: 22% more magnetic area than other types, rugged welded *all-steel* construction, dependable moisture-proof, shock-proof electrical circuits. Complete standard accessories available.

Get details, DEPT. MM-25.

Request Magna-Lock as original equipment on your new machines.

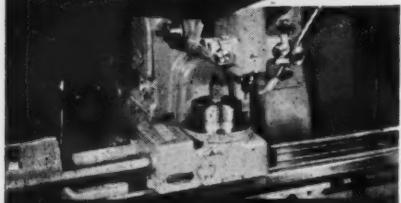
Hanchett MAGNA-LOCK CORPORATION



Magnetic Chucks and Devices

BIG RAPIDS, MICHIGAN, U.S.A.

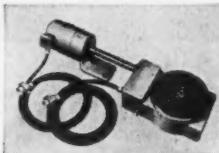
How To Increase Production And Improve Accuracy



With a SUNDSTRAND Automatic Index Base

In many cases, the addition of this Automatic Index Base has increased milling production enough to eliminate need for the purchase of additional machinery. It may be the answer to your milling production requirements. Call in a Sundstrand engineer. There is no obligation for this service.

**Accurate
Spacing,
Powerful
Clamping
Insures
Accuracy**



Sundstrand
Automatic Index Base

This automatic index base is designed so there is no strain against the index plunger during the cut. The base is locked by powerful clamping so that accuracy of index is not affected by heavy cuts.

Get Complete Data Free

This 8 page booklet contains production figures and specifications. Send for your copy today. Ask for bulletin 553.



SUNDSTRAND MACHINE TOOL CO.
2539 Eleventh Street, Rockford, Ill., U.S.A.

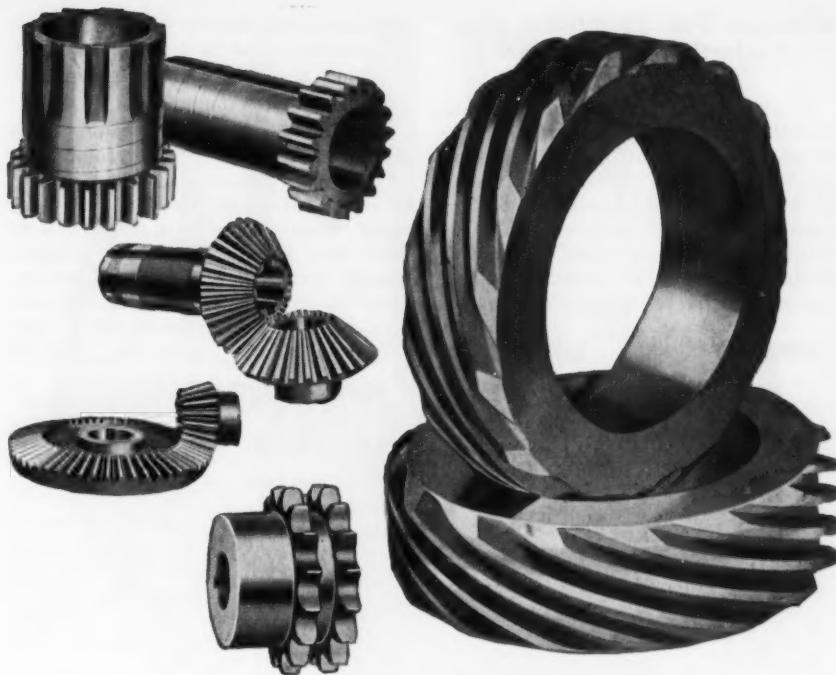
a two-story building to be located at the southeast corner of the new foundry building. The two-story structure will measure 200 feet in length and 120 feet wide and will house foundry offices, the pattern shop, pattern storage and employee locker rooms. Ground has been broken for construction.

★ ★ ★

Gisholt Announces Retirements and New Appointments

George H. Johnson, president of Gisholt Machine Co., Madison, Wis., recently announced the following retirements and new appointments. Alfred B. Morey, vice president and treasurer, has retired after 41 years of service. Mr. Morey began his career at Gisholt in a minor position in the accounting department and worked his way into the executive post he held at his retirement. F. M. Long, director of foreign sales, has retired after 48 years of service. Mr. Long was a machine serviceman when first employed at Gisholt and went to Europe in 1907 as a machine demonstrator. C. K. Swafford, vice president, will retire February 28, 1955. Mr. Swafford also worked his way into his present executive post, starting as a machine operator and serviceman. Mr. Swafford has been with the company for 42 years.

U. S. James, Detroit sales office manager, has retired after 42 years of service. E. K. Baxter, who has worked with Mr. James for many years, will be in charge of the Detroit office. Harold Earl, Moline sales office manager, has retired after 30 years with Gisholt and will be succeeded by Robert Wellman. The company has also announced that H. A. Waddell has been elected treasurer and Arthur B. Morey has been appointed assistant treasurer of the firm. A. G. Hoffer, presently general plant superintendent, will assume the position of works manager on February 28, 1955.



Specify Adams
**for high quality gears
made EXACTLY to
your specifications**

Regardless of quantity or type,
you'll profit by specifying
Adams custom made gears for
your product. Made on the
most modern gear cutting ma-
chines by skilled workmen,
Adams gears are quality con-
trolled to guarantee exact con-
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The ADAMS Company

Dubuque, Iowa, U. S. A.

ESTABLISHED 1883

FINE GEARS MADE TO
YOUR SPECIFICATIONS



Michigan Tool Establishes Gear Production Development Laboratory

To assist gear makers in producing smoother and quieter gears at the lowest possible cost, Michigan Tool Company, 7171 E. McNichols Road, Detroit 12, Michigan, has established a complete gear production development laboratory at its main plant. All the facilities necessary to develop tooling, manufacturing setups and even prac-

tical working designs of new gearing are concentrated in a single location, enabling Michigan Tool to expand its services to customers.

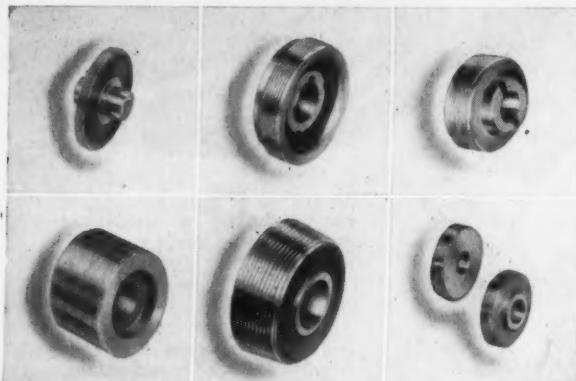
Highest possible production rates consistent with the required tolerances of the gears manufactured are said to be assured through laboratory development of setups for gear shapers, hobs and shavers. Machine attachments, fixtures, automation devices, controls or any other machine im-

provements for boosting production of more accurate and quieter gears are developed and thoroughly tested in the laboratory. In addition, shaper cutters, hobs and shaving cutters for either new or existing designs of gears are modified as required to improve gear quality.

The gear production laboratory is a division of Michigan Tool's engineering department headed by Clayton Scott, chief engineer. Development work is channeled to the laboratory through the engineering department as the result of customer requests, problems encountered by service engineers and customer contacts.

Thread Rolls

on automatic screw machines and turret lathes



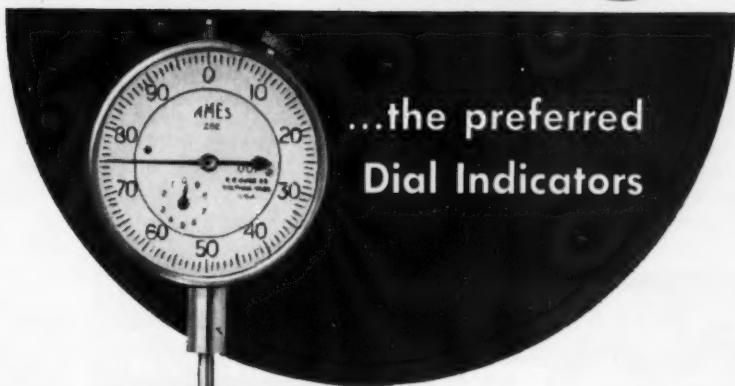
produce uniform,
accurate threads
economically

Reed makes special thread rolls of all kinds. Send us samples or detailed specifications of both roll and thread to be produced.

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Thread Rolling Machines and Dies, Thread Rolling Attachments,
Thread Rolls and Knurls for Automatic Screw Machines and Turret Lathes
WORCESTER, MASSACHUSETTS, U. S. A.

AMES



**Over 16,000,000 cycles
without wear or loss of accuracy...
how many more will they complete?**

Several Ames Model 282 Long Range Dial Indicators with plain bearings are currently giving an amazing demonstration of performance and endurance under test conditions. After more than 16,000,000 cycles each, at 240 strokes per minute, 9 hours a day—they still have their original accuracy!

The reasons for this outstanding record? Simply high quality materials, simple basic design, rugged construction...and expert craftsmanship.

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View of some of the equipment available in Michigan Tool Company's gear development laboratory

Location of the development laboratory in the same plant where Michigan machines and cutting tools are produced and on the floor below the engineering department permits a personal follow-through on all phases of

a development program that materially shortens time required and improves procedure all along the line. It also makes available the combined experience of several gear engineers for consultation in the design of new transmissions.

Equipment in the gear development laboratory includes five gear shaving machines, a lapping machine, a hobbing machine, a gear shaper, a chamfering machine, an involute checker, a lead checker, a gear checker and a checking recorder. Development work on both internal and external spur or helical gear tooling can be handled with this equipment.

Up to the present time, the development work which has been performed by the laboratory has been about equally divided between that pertaining to gears now in production, and experimental gears being developed for future use.

★ ★ ★

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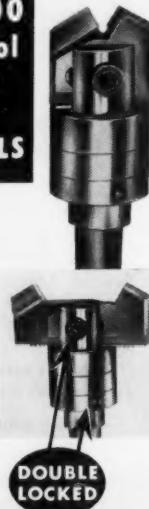
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Diamond Anniversary

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S.E.S.A. 1955 Spring Meeting

The Society for Experimental Stress Analysis has announced that its 1955 Spring Meeting is scheduled to be held April 27, 28 and 29, 1955, at the Hotel Statler in Los Angeles, California. Further information regarding this meeting may be obtained by writing to Dr. W. M. Murray, Secretary-Treasurer, Society for Experimental Stress Analysis, P.O. Box 16, Central Square Station, Cambridge 39, Mass.

Consolidated Machine Tool Corporation Becomes Division of Farrel-Birmingham

Consolidated Machine Tool Corporation, wholly-owned subsidiary of Farrel-Birmingham Co., Inc., Ansonia, Conn., has been dissolved as a separate corporation and its business and activities are being conducted as a division of the parent company. The new division will be operated as Consolidated Machine Tool Company, a division of Farrel - Birmingham Company, Incorporated. Activities will continue in the Rochester, New York, division as before, and management will remain the same.

Farrel - Birmingham acquired Consolidated as a wholly - owned subsidiary in December, 1951, by purchase of the common stock from its former owner, the late Arthur H. Ingle. Mr. Ingle formed the Consolidated Corporation in 1922 by merging the interests of several well-known machine tool builders, some of which date back nearly to the time Farrel - Birmingham was founded, well over a century ago. Lester D. Chirgwin, president of Consoli-

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dated, stated that this current move is for the purpose of simplifying the administration of the company and will entail no physical changes other than some minor changes in the accounting and billing departments.

* * *

Colonial Broach Employees Receive 30-Year Service Pins

Diamond lapel pins honoring their 30 years of service have been presented to five veteran employees of Colonial Broach Co., Detroit, Mich., by Arvid O. Lundell, president of the firm. Employees receiving the service pins are Carl J. Halborg, former president and now acting as consultant; George L. Halborg, assistant master mechanic; A. Peterson, grinder; G. F. Knudsen, broach sharpener; and Hal Reynolds, Cleveland area sales representative. They are the first employees of the 36-year-old company to become eligible for the 30-year service awards. The pins were received in a special ceremony held in Mr. Lundell's office.

* * *

The L. S. Starrett Company Celebrates 75th Anniversary

This year will mark the diamond jubilee of precision toolmaking by The

L. S. Starrett Co., Athol, Mass. Seventy-five years ago, in 1880, Laroy S. Starrett invented and began to manufacture the combination square, a tool that is still one of the most basic and most useful items in a mechanic's kit. This event not only marked the beginning of precision tool manufacture by Starrett, but also led to the development of a complete line of hand measuring tools and precision instruments.

In the 75-year history of the company, it has expanded from a room in a small machine shop to one of the largest manufacturing plants in the world devoted exclusively to the production of mechanic's hand measuring tools and precision instruments, including steel rules, steel tapes, dial indicators and gages, hack saws, band saws, band knives and precision ground die and flat stock. The combination square of 1880 has become an imposing catalog of more than 3,000 items. A handful of craftsmen has become an organization employing from 1,500 to 2,000 people, all working to keep these tools flowing to industry through industrial supply distributors, automotive jobbers and tool dealers. The L. S. Starrett Company will celebrate its Diamond Jubilee of Precision Toolmaking throughout 1955.



(Left) Original "home" of The L. S. Starrett Co., Athol, Mass., in 1880. (Below) Present modern plant of The L. S. Starrett Company



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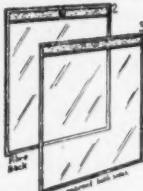


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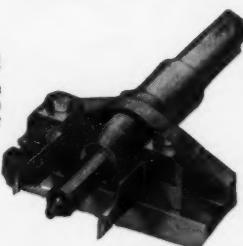
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Norgren Announces Management Changes

Important changes in the top management of the C. A. Norgren Co., Englewood, Colo., have been announced by Carl A. Norgren, president. The changes have added three new officers to the company organization and effected new supervision in four divisions of the company. C. Neil Norgren was advanced to a newly-created post of executive vice president. Mr. Nor-

gren has been with the firm for the past 12 years. In 1947 he became purchasing agent and credit manager and more recently has been vice president and assistant general manager. Delbert G. Faust has been appointed to another new position in the firm as vice president in charge of sales and advertising. Mr. Faust has been with the Norgren firm for the past five years as chief engineer.

Leigh H. Norgren steps up to the

new role of vice president in charge of engineering and production. His service with the company has extended over a period of eight years as industrial engineer, plant superintendent, assistant to the vice president and treasurer and assistant secretary. George L. King has been named the new treasurer. Mr. King has served as office manager and general counsel since joining the organization in 1953. J. A. Wilson has been appointed chief engineer to fill the post vacated by Mr. Faust. Mr. Wilson has been a design engineer, supervisor of design and drafting and assistant chief engineer since joining Norgren.

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Illustration showing ground breaking for new west coast facility of The Cleveland Crane & Engineering Company. (Left to right) Edgar A. Griswold, building contractor; C. H. Saier, sales manager of Cleveland Crane Heavy Machinery Division; H. T. Florence, executive vice president and general manager of Cleveland Crane; Fred Everard, Cleveland Tramrail western district manager; and P. H. Bertola, president of General Conveyor, Inc.

The new alignment in top management of the firm has been made to effect a more closely integrated working organization and greater operating efficiency.

* * *

Cleveland Crane & Engineering Builds New West Coast Facility

The Cleveland Crane & Engineering Co., Wickliffe, Ohio, has announced the erection of a plant located at 6435 Corvette St., Central Manufacturing District, Los Angeles, Calif., to house office, warehouse and manufacturing facilities. The building will be occupied jointly by Cleveland Crane and Gen-

eral Conveyor, Incorporated, their California Cleveland Tramrail distributor. According to company officials, the new facility will greatly expedite deliveries of Cleveland Tramrail overhead materials handling equipment throughout the west because a large stock of parts will be kept on hand. Also, it will enable the rendering of a complete direct service, including engineering, manufacturing and erection for the solution of various local handling problems.

* * *

National Broach & Machine Company Celebrates 25th Anniversary

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gear production machine tools, inspection equipment and broaches, is now celebrating its 25th year of operation. The company, which is the originator of the rotary crossed axis gear shaving process and one of the world's largest producers of gear finishing machines, was incorporated in Detroit on November 29, 1929. Its founder, the late R. S. Drummond, bought a Dayton, Ohio, firm called the National Broach Company and moved it to De-

troit to form the company under its present name. In 1951, National Broach expanded its facilities at 5600 St. Jean Avenue for the eighth time. This last expansion increased the company's floor space some 30 per cent. Three more expansions have been made by the firm since 1951, and the present plant occupies 13 times the floor space of the original building in which the company started operations in 1929.

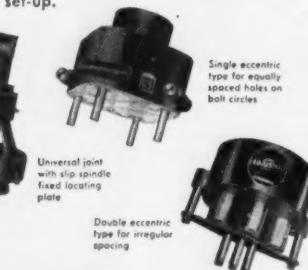
More than 50 per cent of National Broach's nearly 500 employees have been with the company more than 10 years. Nine employees of the company, including its current president, Walter S. Praeg, will receive 25-year service pins and engraved gold watches. Mr. Praeg came to Detroit with the Dayton firm and served as the first chief engineer of the new company.

The company sells gear finishing and inspecting machines and allied tools, as well as broaches, to American metalworking manufacturers and metalworking plants making gears in every industrialized foreign nation in the world.

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Seneca Falls Machine Constructs Building to House New Division

Seneca Falls Machine Company has announced the construction of a new building adjacent to its main plant in Seneca Falls, New York, to house its newly formed Electronics Division and to provide space for its rapidly growing engineering department. The new building will be completely air conditioned throughout. In addition to the enlarged engineering section, space has been provided to accommodate an

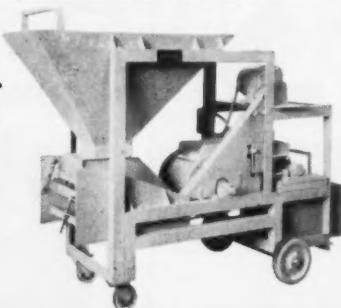
increase in the sales engineering division, and additional space located directly adjacent to the engineering department has been set aside to accommodate a complete experimental engineering and electronics development laboratory.

★ ★ *

P. L. Houser Elected President of Metal Cutting Tool Institute

Colonel P. L. Houser has been elected president of the Metal Cutting Tool Institute, succeeding Mason Britton who has become vice chairman. Colonel Houser has been general supervisor of Manufacturing Stand-

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Colonel P. L. Houser

ards Research, International Harvester Company. George F. Holland, president of Union Twist Drill Company, has been elected to the position of chairman of the board of the Metal Cutting Tool Institute.

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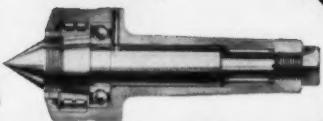
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E. Franklin Motch

E. Franklin Motch, president and treasurer of The Motch & Merryweather Machinery Co., Cleveland 13, Ohio, distributor and builder of machine tools and cutting tools, died recently at his home at 22250 McCauley Road, Shaker Heights, Ohio, at 46 years of age. Mr. Motch was graduated from Yale University in 1931 and became associated with The Motch & Merryweather Machinery

Company in 1933. In 1946, he was appointed vice president and treasurer of the company, and in 1953, he succeeded to the presidency. Mr. Motch was the son of one of the three founders of Motch & Merryweather, the late Stanley Motch, formerly treasurer of the company.

Mr. Motch was a director of Baker Brothers, Inc., Toledo, Ohio; Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.; Gould & Eberhardt, Inc.,

Irvington, N. J.; the Central National Bank and the Wilson Transit Company, both of Cleveland, Ohio; and of Motch, Inc., Covington, Ky. He was a member of the Union Club, Chamber of Com-

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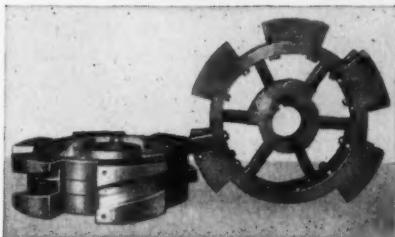
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E. Franklin Motch

merce, Kirtland Club, Tavern Club and the Yale Club, all of Cleveland; of the Queen City Club, Cincinnati, Ohio; and of the Whitfield Woods Pheasant Reserve in Middlefield, Ohio.

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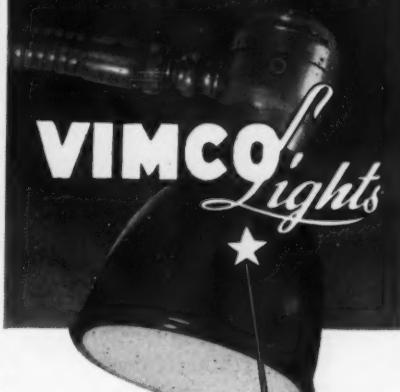
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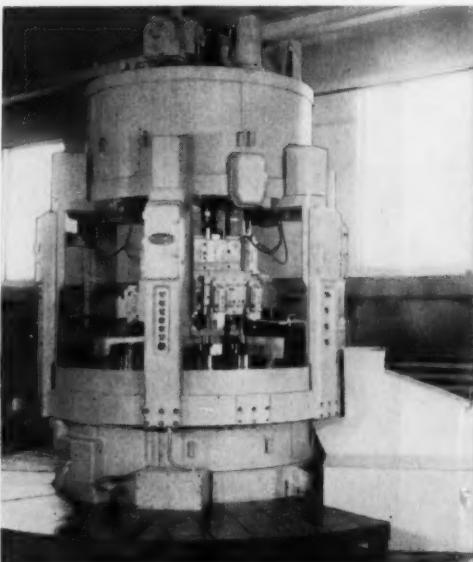
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Multi-Spindle Vertical Chucking Machine Features Screw-Type Feed Mechanism

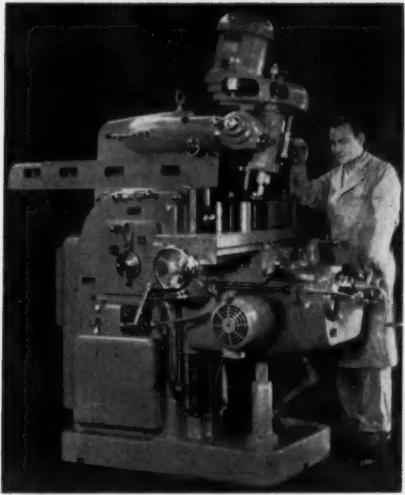
The Bullard Co., 286 Canfield Ave., Bridgeport 2, Conn., has introduced the Type "L" Multi-Au-Matic Multi-Spindle Vertical Chucking Machine which features a control system that facilitates head setting and tool adjustment with a minimum of effort on the part of the operator and a screw-type feed mechanism. The feed mechanism, having a total available stroke of 16 inches, affords constant advance of the cutting tools to the work. Since only the required portion of the total stroke need be used, considerable time-saving in the automatic cycle is accomplished. An improved type of mechanism permits faster spindle carrier index, again contributing to reduction of time lost between cuts. Index registry and the spindle bearing mounting are said to result in unusual accuracy.

The Type "L" machine is available in a 10-inch size with 6, 8, 12 or 16 spindles and in 14 and 18-inch sizes with 6 or 8 spindles. Selective feeds and speeds at each work station are possible through the use of a gear synchronizer. For example, in the 10-inch machine, spindles may be geared up to 1,000 r.p.m. as the spindles on the

carrier are indexed from one station to another in automatic cycle. The machine is a heavy construction, permitting input of up to 150 h.p. A complete line of accessories is available, such as multi-purpose heads, drill heads, tapping heads and precision



Bullard Type "L" Multi-Au-Matic Multi-Spindle Vertical Chucking Machine



Gorton No. 2-28 Horizontal Mill arranged for angular super-speed milling

boring heads. Automatic loading devices, automatic gaging equipment and chip conveyors can be supplied as extra equipment.

★ ★ ★

Milling Machine Operates Horizontally, Vertically or Universally

The George Gorton Machine Co., 1321-Z Racine St., Racine, Wis., has announced the addition of a horizontal-vertical-universal milling machine to its standard line. Basically, the machine is a heavy-duty No. 2 or medium-duty No. 3 horizontal mill with a "receptor ram" in place of the conventional overarm. The receptor ram accommodates the standard Gorton arbor supports and arbor support brace for operations such as slab milling or straddle milling. For face milling, the arbor supports and brace are removed together with the arbor. The receptor ram is then moved to the rear until its front end is flush with the column face. For super-speed vertical

or angular milling, the receptor ram remains in the rear position and the universal head and ram assembly is moved forward to cutting position. In this way, three kinds of milling operations can be performed on the same machine without disturbing the work.

The horizontal spindle has a speed range from 25 to 2,000 r.p.m., making it ideal for carbide cutters and climb milling. By attaching a heavy-duty vertical attachment on the machine parking bracket, roughing cuts can be taken within the same speed ranges. For finishing, the vertical attachment is swung aside and the super-speed universal head and ram assembly is moved into position, providing speeds up to 5,000 r.p.m. A tracer head and duplicator table can be installed for manual duplicating.

★ ★ ★

Improved Centerless Grinder Is More Than 1,000 Pounds Heavier

Cincinnati Grinders Inc., Cincinnati 9, Ohio, has announced the improved Filmatic No. 2 Centerless Grinding Machine which is more than 1,000 lb.



Cincinnati Improved Filmatic No. 2 Centerless Grinding Machine

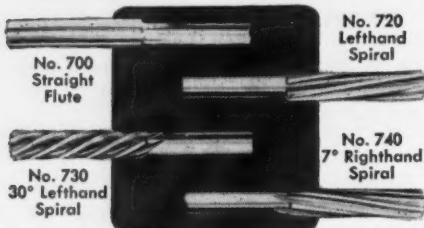
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DECIMAL REAMER

with all Flutes ground Face
and Back after heat treatment . . .
preventing

Clogging or Freezing of chips for
REMARKABLE SMOOTH REAMING



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when you can buy a **SUPERREAM** decimal
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GARBERDING
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Made in uniform width to fit any stand-
ard width slots. Simply grind ends to fit.

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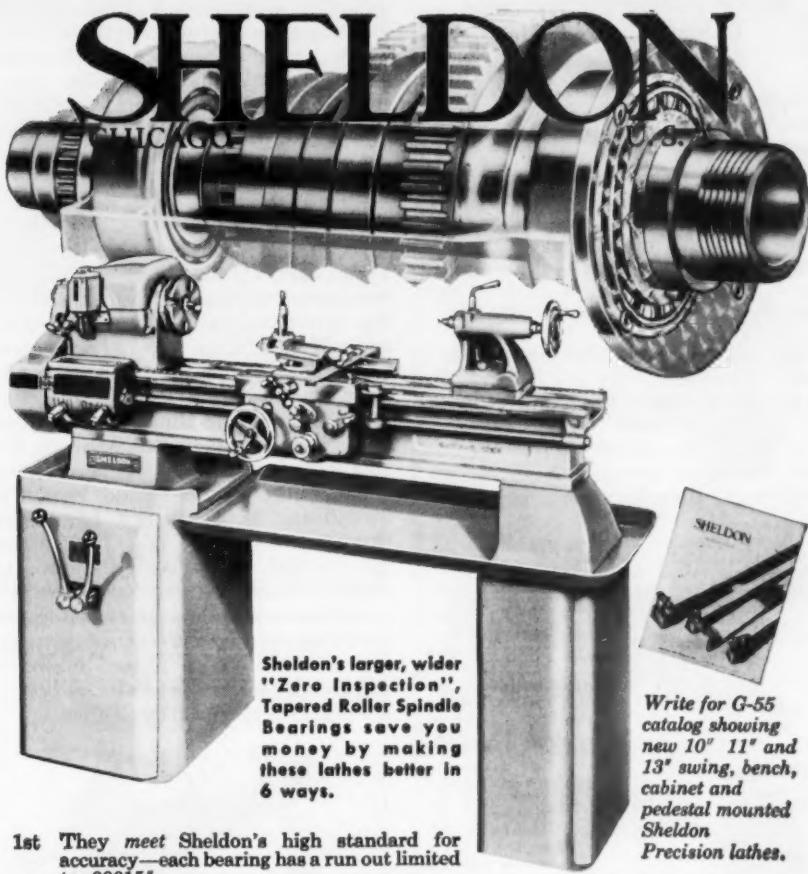


**TWENTIETH CENTURY
MANUFACTURING CO.**

ROUTE 176 and BRADLEY ROAD
BOX 429-M, LIBERTYVILLE, ILL.

heavier than its predecessor and which incorporates many new features. Filomatic bearings have been retained for the grinding wheel spindle. The bearings are self-adjusting for all conditions imposed by the grinding action, automatically lubricated with filtered oil from a circulating system and protected with an electrical pressure switch. A "lower slide" unit, mounted on bed ways at right angles to the grinding wheel spindle, supports an "upper slide" unit which carries the regulating or feed wheel. This type of construction is said to simplify setups and sizing adjustments because the workrest is mounted on the lower slide where it can be readily positioned in proper relation to the two wheels. In operation, the upper and lower slides are locked together and glide as a unit over anti-friction ways on the bed.

The regulating wheel is driven by a built-in 1½-h.p. motor through a back gear combination and a wide V-belt. Regulating wheel speeds are infinitely variable, within two ranges, from 11 to 320 r.p.m. Power operated profile truing is standard equipment for the grinding wheel. The infeed handwheel for size adjustment and positioning the slides when setting up the machine is now located on the upper slide, at the operator's working position. It incorporates all the refinements of a center-type grinder cross feed mechanism, with a 0.0001-inch graduated dial and a 0.001-inch graduated dial. For infeed grinding, the operator uses the infeed lever connected directly to the infeed screw. A 90-degree arc of this lever downward and return completes a hand infeed cycle. The motor and electrical controls are completely enclosed, and the machine is wired to comply with J.I.C. standards. Push-buttons are located on the front of the bed at the operator's working position. A wide variety of standard fixtures and attachments are available,



**Sheldon's larger, wider
"Zero Inspection",
Tapered Roller Spindle
Bearings save you
money by making
these lathes better in
6 ways.**

- 1st They *meet* Sheldon's high standard for accuracy—each bearing has a run out limited to .00015"
- 2nd They absorb thrust and radial loads beyond requirements—basic rating on front bearing at 500 R.P.M.
- 3rd They *end* costly bearing maintenance—require only a fractional turn of bearing take-up after long periods of service.
- 4th They *hold* the spindle in rigid alignment while permitting it to turn freely at high or low speeds—the line contact between rolls and races, and the opposing taper design, preclude lateral movement or end play.
- 5th They *minimize* friction—smooth mirror finished rollers and races running in light oil, deliver more horsepower at the Spindle Nose and lower power costs.
- 6th They *increase* work capacity. Larger than similar type bearings on other lathes in this price range, these bearings make it possible to turn out *more work* and *better work* at lower costs.

for radial loads..... 3540 lbs.
thrust loads..... 2335 lbs.

*Write for G-55
catalog showing
new 10", 11" and
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pedestal mounted
Sheldon
Precision lathes.*

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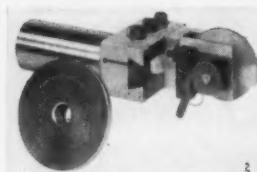
Screw Machine Attachment Eliminates Separate Marking Operations

Automatic die marking of part numbers, patent numbers, trade marks, etc., during the operating cycle of automatic and hand operated screw machines, bench and turret lathes, etc., on almost any surface of a part is possible with the complete line of automatic roll markers available from New Method Steel Stamps, Inc., 147 Joseph Campau, Detroit 7, Michigan.

Suitable for both light and heavy work, the markers are practically fool-proof and eliminate the need for separate setups for marking, thus reducing cost, scrap, etc. Quick interchangeable roll dies give remarkable versatility and reduce time for setup changeover.



1. Model 500-C for automatically marking on outside cylindrical surfaces of screw machine parts.



2. Model 600-E for marking on the end face of parts. Normally installed in tailstock of a screw machine or similar position on other machines.

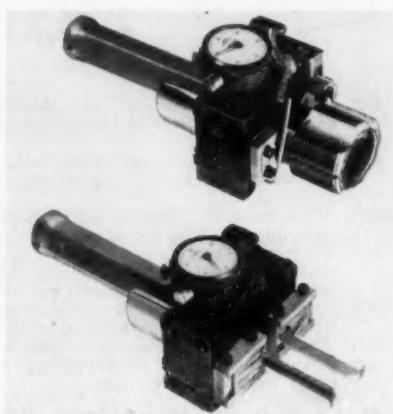
Illustrated are two of the three basic models of the cost cutting markers. Model 700 (not shown) is for marking and cutting off at the same time. The marker occupies the cutoff slide, leaving other stations open for machining operations. New Method also manufactures a complete line of hand stamps, inspectors' stamps, embossing dies, marking hammers, type and type holders, etc. Precision marking and engraving services available.

including work rests, long bar grinding attachments, automatic electro-hydraulic and roto-infeed attachments, automatic and hand grinding wheel spindle reciprocation and Feedmatic hoppers.

★ ★ *

Gage Checks Both Internal Threads and Internal Grooves

Bryant Chucking Grinder Co., Springfield, Vt., has introduced a gage, designated as the Model P-21, featuring interchangeable segments which allow both internal threads and internal grooves to be checked with one gage. The gage is built on the principle of an "expanding" plug which actuates a precision dial indicator, showing the size comparison of the part being checked to a master setting ring. The instrument is designed to check threads from $\frac{5}{16}$ to 5 inches in diameter quickly and easily. According to the manufacturer, the gage also provides a high-speed method of checking the diameter and roundness of internal grooves or recesses up to 5 inches in diameter and grooves located at depths from 1 to 2 inches from a face.



Bryant Model P-21 Gages with (above) segments for checking internal threads and (below) segments for checking internal grooves

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The Micro-Height Gauge is a precision instrument, finished in satin chrome, which reads like a micrometer and measures from zero at base to 3" in thousandths. Use as a scribe for fast layout, or insert dial indicator for quick, accurate inspection.

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APPROVED BY U.S. DEPT. OF LABOR
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Types include, Floor, Overhead,
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Send for circular.

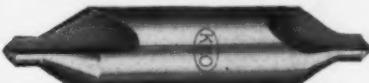
D & M GUARD COMPANY

893 Military Road • Buffalo 17, N. Y.

February, 1955

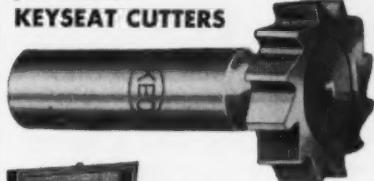
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High speed. Right hand $\frac{1}{4}$ " shank. Diameter from $\frac{1}{4}$ " to $1\frac{1}{4}$ ". Standard sizes in stock for immediate delivery. Complete set —41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.



CENTER REAMERS

High speed steel. Reamers from $\frac{1}{4}$ " to 1" regularly furnished with 60°, 82°, 90° included angle. Specials made for your specifications.

LATHE MANDRELS



Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from $\frac{8}{16}$ " to 1" are .0005" undersize at small end, from $1\frac{1}{16}$ " to 3", .001" undersize. Immediate delivery.

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Illustrated literature and prices on all KEO Products mailed on request.

KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

MODERN MACHINE SHOP 253

Shear Makes Clean Cut of Small Angles

Bateman Foundry & Machine Co., Mineral Wells, Texas, has announced a shear which is designed to provide a clean cut of small angles up to $2 \times 2 \times \frac{1}{8}$ inch and flats up to $\frac{1}{4} \times 4$ inches without grinding. According to the manufacturer, 44 strokes per minute can be obtained by opening the clutch. The machine is made of high grade cast iron with hardened clutch, clutch pin and shear blades. The clutch is operated by hand or by foot as desired. The shear is equipped with a fly-



Bateman Shear

Accurate Hole Transfer Made Easy With **NIELSEN TRANSFER SCREWS**

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from $3/16''$ to $\frac{1}{2}''$ U.S.S. Inexpensive — Last for years.



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wheel and gear drive for power with a $\frac{3}{4}$ -h.p. motor. The unit requires 24×27 inches of floor space and is 56 inches high from the floor to the top, including the stand.

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New ** Chatter Resistant, Spring Loaded Spindle

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Diamond \$7.00

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Hardened shaft—bearing adjustable for wear.
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Precision Ground Surfaces. Can be set
very accurately with a Protractor or
Sine Bar. Works underneath the wheel.
Large bearing surfaces.

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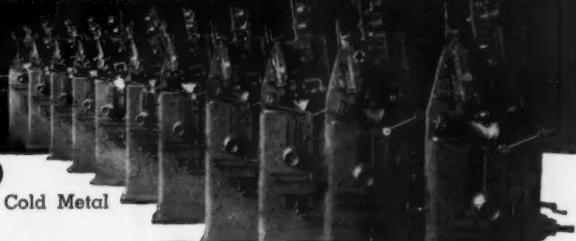
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For Automatic Grinding of Cold Metal Saws.

Rigid — Accurate — Fast.
 Ball Bearing Mounted Head Slides.
 Heavy Duty Construction Throughout.

For inserted tooth, segmental type, solid tooth circular saws made in three sizes — Models 1130, 1160, 1172.
 Saw capacities 8 to 72 inches and larger.
 Other Models—Hot and Cold Saws, No. 12 and No. 572 (all sizes).





Two Views of High and Low Toothing Metal Cutting Saws

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World's Largest Manufacturers of Shear Blade, Knife and Saw Grinding Machinery
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Semi-Universal Dividing Head Is Easy to Handle

Karl A. Neise, Dept. MMS, 404 4th Ave., New York 16, N. Y., has intro-



Walter Model SHU IV Tilting Semi-Universal Dividing Head

duced the Walter Model SHU IV Tilting Semi-Universal Dividing Head which is said to be easy to handle and which features high precision and a concentricity of run that is maintain-

ed for a long period even under rough working conditions. According to the manufacturer, the great number of indexing operations, such as quick indexing, plain indexing and indexing in degrees, and the swivel range of 90 degrees, as well as the low construction of the dividing head in vertical position, account for the versatility of the attachment. The versatility of the dividing head is said to be increased by various useful accessories which are easily interchangeable.

The head features cone-supported, ground index spindle; rigid locking of index spindle by means of concentric clamping in axial direction without affecting setting of indexing attachment; nitrided and ground worm spindle which can be adjusted and swung; and hardened and ground wear parts. Index plates for any number of divisions between 2 and 48 are available. The standard type index plate has a 360-degree graduation on its peri-

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A Precision Tool
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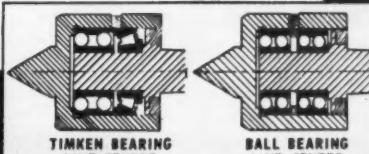
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QUADRO LIVE CENTERS will take heaviest loads at highest speeds for the longest time. That's why they are specified 8 out of 10 times by factory management. On lathes, millers — any machine tool — you can count on QUADRO CENTERS for closer tolerances, fewer rejects, greatly increased production. Guaranteed!

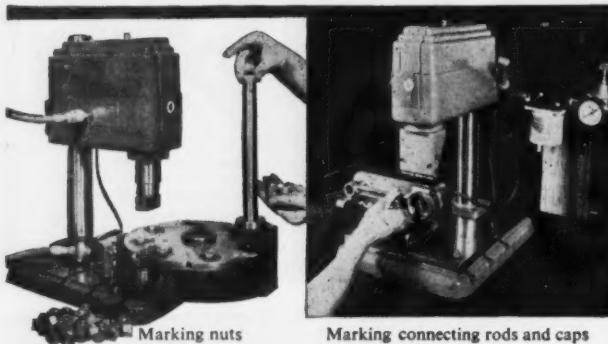
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Grinders Sharpen All Types of Tool Materials

Identified as the Style 46-D and the Style 49-A, two tool grinders, one using 6-inch wheels and the other using 14-inch wheels, have been introduced by Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. Both machines are double-end models with reversible motors, large easily-adjusted tool rest tables, and both are said to be suitable for sharpening all types of tool materials—high speed steels, cast alloys and carbides. The Style 46-D is a general - purpose grinding using 6-inch plate type wheels for face grinding. It has an inbuilt motor spindle that is permanently lubricated. Coolant flows by gravity from a reservoir above the spindle. Tool rest table and spindle are at a convenient height to minimize operator fatigue.



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Tool Grinder

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28 SO. ST. CLAIR STREET TOLEDO 4, OHIO**CAMS**

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Design Assistance OfferedKIDDE PRECISION TOOL CORP.
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AUTOMATIC REVERSE
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No. 1A FRICTION DRIVE
TAPPER — capacity No.
2-56 to $\frac{3}{8}$ " in Steel —
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No. 3A POSITIVE TAPPER — capacity $\frac{1}{2}$ " to $1\frac{1}{4}$ " in Steel — $\frac{1}{2}$ " to $\frac{3}{4}$ " Pipe Taps.

No. 4A TAPPER — capacity $\frac{3}{4}$ " to 2" in Steel including Pipe Taps.

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STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

**HIGHER SPEEDS!
FASTER GRINDING!****kipp****AIR GRINDERS**MODEL JA
50,000 R.P.M.**\$42.00**

IN U.S.A.



Weight 12 ounces;
length 6 $\frac{1}{4}$ inches;
chuck size $\frac{1}{2}$ inch.
Wheelguard removed
for better illustration.

The RPM's stay up while
grinding . . . not only when the
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better work—longer wheel life.

High speed grinding with small
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It was born out of a pressing need
in our tool room. Because tool
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to utilize Kipp grinders in your
tool room as generally as we do
in our own.

kipp**MADISON-KIPP CORP.**
208 Waubesa St., Madison 10, Wis., U.S.A.



Ex-Cell-O Style 49-A Tool Grinder

The Style 49-A is a heavy-duty model using 14-inch wheels for fast sharpening of large tools and for rough grinding smaller sizes. It is supplied

with a pressure coolant system having individual control valves at each side of each wheel. A coolant settling tank is included. The machine is said to be easy to clean.

★ ★ ★

Improved Pedestal Design Is Feature of Sheldon 1955 Lathes

Sheldon Machine Co., Inc., 4250 N. Knox Ave., Chicago 41, Ill., has announced an improved design on its 1955 lathes. Featuring greater operator convenience, the pedestal mounting is sturdy and functional in design, is made of heavy cast iron and fully encloses the motor and drive. The tailstock leg provides a large storage space for the convenient storage of tools and accessories. The pedestal is available on all 10, 11 and 13-in. swing lathes.

Other improvements include the

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COMBINATION ROTARY TABLE AND ANGLE PLATE

PRECISION ACCURACY

WORM adjustable from 0 to 90 degrees.

VERNIER control to within

2 seconds of Arc.

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NON-ROTATING DRILL STOP for Precision Hole Depth Control

Now you can be certain of positive control of hole depth with the WOHLNIP Precision Drill Stop . . . which is Non-Rotating. Will not mar, mark or damage the face of the work, fixture or bushing. Completely automatic, the WOHLNIP Drill Stop reduces human errors, simplifies difficult jobs, lowers machining cost, increases production and accuracy, eliminating rejects. Used for drilling, center drilling, countersinking, boring, milling, routing, reaming. Used on drill presses, radial drills, milling machines, lathes, turret lathes, hand and automatic screw machines. Available as shown and with standard straight and taper shanks for any size needed.

(Patent Pending)

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Write for Bulletin MS-70.



Hand shank illustrated. Press shank for foot or power presses also available.

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

TOOLMAKERS!



Sizes:
2", 4" and 6".

NOW SET-UP FASTER--

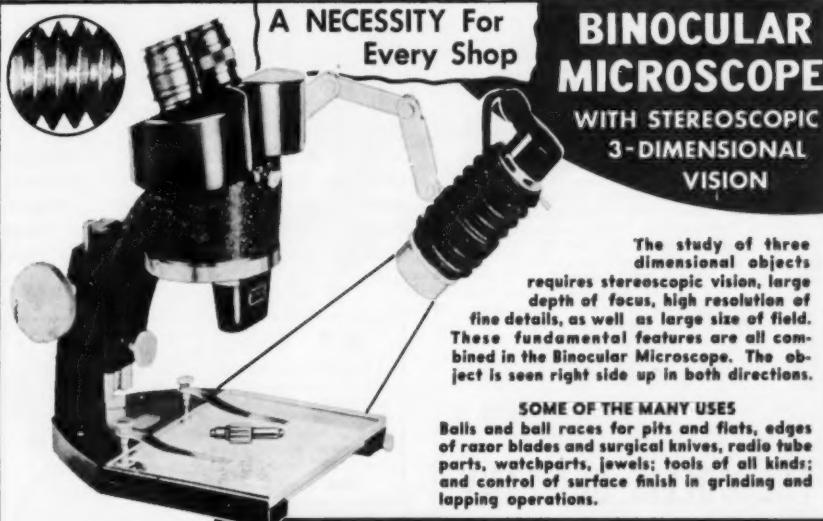
Save time on intricate, angular set-ups with the fully universal MASTER MULTI-SWIVEL VISE. Three swivels instantly set any compound angle. Used worldwide. Interchangeable platens optional.

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A NECESSITY For
Every Shop



The study of three dimensional objects requires stereoscopic vision, large depth of focus, high resolution of fine details, as well as large size of field. These fundamental features are all combined in the Binocular Microscope. The object is seen right side up in both directions.

SOME OF THE MANY USES

Balls and ball races for pits and flats, edges of razor blades and surgical knives, radio tube parts, watchparts, jewels; tools of all kinds; and control of surface finish in grinding and lapping operations.

WRITE FOR
ILLUSTRATED FOLDER

Geo. SCHERR OPTICAL TOOLS, Inc.
200 MM LAFAYETTE STREET • NEW YORK 12, N. Y.

adoption of double neoprene cog V-belts to the spindle for greater pulling power and longer life. The belts are said to be resistant to oil, heat and static. A safety-type switch prevents accidental turning on or off of power. Special formica end gears provide quiet and safe operation.

Illustrated herewith is the Model UM56P, a 13-in. swing lathe with 34 in. between centers, which features the



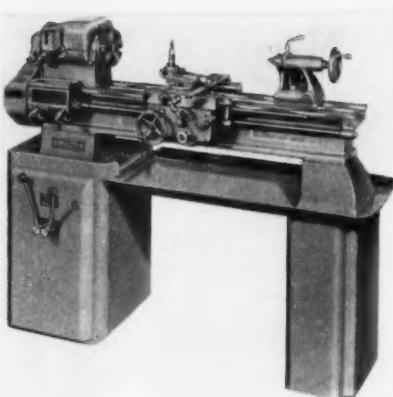
COLLET EQUIPMENT

- Use-Em-Up Type Drill Sleeves
- Use-Em-Up Type Drill Sockets
- Standard Type Drill Sleeves
- Standard Type Drill Sockets
- Short Shank Type Sleeves
- Short Shank Type Sockets
- B. & S. Taper to B. & S. Taper Sleeves
- B. & S. Taper to Standard Taper Sleeves
- Standard Taper to B. & S. Taper Sleeves
- Rough Shank Sockets
- Solid Type Sockets
- Morse Taper Shank Tap Sockets
- Standard Spot Facing Cutter Bars
- High Speed Point Lathe Centers
- Carbon Steel Lathe Centers
- Pipe Centers for Lathes
- Lathe Bushings
- Blank End Arbors
- Chuck Arbors
- Drill Drifts
- Magic Type Chucks and Collets

Standard tools for all drilling, reaming, and tapping needs and special tools to order. Immediate attention to regular or special requirements.

THE COLLIS COMPANY
CLINTON, IOWA

Dept. A



Sheldon 1955 Model UM56P Lathe with improved pedestal design

improved pedestal design. Other features of the machine include the "zero precision" tapered roller bearings supporting the spindle. The bearings have a single take-up for adjustment and wear.

The lathe apron is double walled and has a friction disc-type clutch for engaging both power and longitudinal and power cross feeds. A built-in safety interlock prevents damage to the lathe by engaging a second feed while the lathe is in operation. The quick-change gearbox has 54 different pitches with many special "hard-to-get" threads. Rapid selection of pitches and feeds can be made while the lathe is running.

AT LAST!

A Low-Priced Dial Type Indicator Has 2 contacts $1/32''$ threaded within $1/8''$. Double Faced. Reads front and back. Two Crystals. Double faced dial Indicator complete with plated holder including $1/32''$ and $1/8''$ contacts —

Black Penetrate ... \$8.95
No. 4 Superior Magnetic Base and Indicator Holder... \$8.95
Thousands of satisfied customers!

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CYLINDRICAL RACKS
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Accurate Gear Works**

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ACCURATE for service and dependability
when you need it!

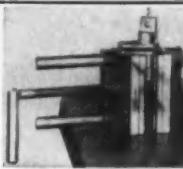
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"Shur-Grip"
Drill Vise**

For fast, accurate
drilling, reaming,
tapping.

Built-in parallels. Handle swivels. V grooves hold rounds up to 2", both vertical and horizontal. 3-way vise holds square, rectangular and round parts.

Write for illustrated circular.

CROSSLEY MACHINE & TOOL CO., INC.
185 YORK AVE. PAWTUCKET, R. I.



So many standard styles . . . one must be just right for you!



For 66 years we have been producing metalworking tools and adding to our standard line. Today we have PUNCHES and DIES in a large range of round, flat, oval, and square sizes, to fit most makes of punch presses, immediately available from stock at regular low, standard prices.

SEND FOR OUR COMPLETE
CATALOG SHEETS.

T. H. LEWTHWAITE MACHINE CO.
317 East 47th St., New York 17, N. Y.

Beverly THROATLESS SHEAR
Cut any Shape... STRAIGHT OR IRREGULAR



Make any cut—curved, straight or irregular, faster, easier and better with less material waste on a Beverly Throatless Shear. You can turn work to any position and make a clean cut as you go. Handles heavy gauges with ease—lighter metals without distortion. 4 models—capacities 18 gauge to 3/16" mild. All shears equipped with High Carbon, High Chrome Blades.



INSIDE SLOTTER

8" Reach—16 ga. cap. Makes inside slotting cutting faster, easier, cleaner. Punch and die arrangement of 5 blades assures accuracy, clean cutting action. Cuts 2 1/2" x 1/16" slot at one stroke. Throat design permits pivoting work at any point in stroke for special inside cuts. Note sample cuts at left.

See your Beverly
Dealer or write for
Illustrated catalog

BEVERLY SHEAR MFG. CO., 3000 W. 111th St., Chicago 43, Ill.



Model WD-10 Wet
or Dry 10" Carbide
Tool Grinder.

HAMMOND Carbide Tool Grinders will soon pay for themselves through greater wheel economy, longer tool life and faster grinding.

AMERICA'S MOST COMPLETE LINE.

6", 10", 14" Wet or Dry –
Chip Breaker Grinders – Dia-
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Hammond Machinery Builders

1615 Douglas Avenue • Kalamazoo, Michigan

KAUFMAN TAPPING MACHINES

BUILT FOR SPECIFIC PRODUCTION JOBS

- Single or Multiple Head Operations
- Precision Depth Control
- Non-reversing Motor Drives
- Pressure Lubricated Lead Screws
- Fast, Accurate Rugged Index
- Other Head Units Available
- Other Worthwhile Features.

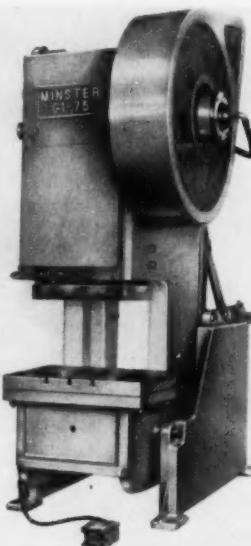
Catalogs Nos. 754 and 1153
Mailed on Request.

Model 75-24

KAUFMAN
MANUFACTURING CO.
551 So. 29th Street,
Manitowoc, Wis.

75-Ton Gap Press Features Fabricated Steel Frame Design

Designated as the GI-75, a fabricated steel C-frame press in the 75-ton class which is available in fixed base and inclinable, flywheel or clutch in gear types has been announced by Minster Machine Co., Minster, Ohio. The press utilizes a long flanged slide with barrel-type adjustment. The slides have box-type cast construction designed to eliminate way deflection and feature long barrel-type manual slide adjustment with the rod extended to the top of the slide flange for ratchet wrench operation. An adjusting rod lock is provided, and a power slide adjustment is available as extra equipment. According to the manufacturer, the slide ways are unusually long, bronze lined and scraped square to the slide face. Counterbalances are mounted on the right front and the left rear gibs within the frame to reduce the power required to



Minster GI-75 Flywheel-Type Gap Press

THE VISE WITH A
THOUSAND GRIPS



'FLEXIBLE JAWS' grip all shapes. Grips secure and positive for precise milling, drilling and cutting operations. Eliminate the time and expense of blocking and shimming irregular pieces for toolroom machining. Applicable on any machine tool. Try it in your shop. Save time and dollars on small production runs.

• WRITE FOR INFORMATION TODAY!



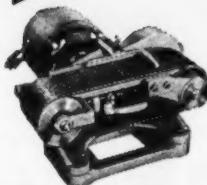
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UNIVERSAL FIXTURES

AMERICAN POSITIVE GRIP VISE CORP.

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DOES IT BETTER
DOES IT FASTER

SIMPLEX-M
ABRASIVE BAND
GRINDER



The precision of a machine tool plus the durability of a workhorse. Complete with $\frac{1}{2}$ H.P. Heavy Duty Motor and automatic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

OTHER STYLES AND SIZES IN NEW
MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.

333 Nassau Avenue, Brooklyn 22, N.Y.

TROYKE ROTARY TABLES

- Saves fixtures and time consuming setups.
- Saves time in circular positioning.



CAM LOCKING TYPE ROTARY TABLES

Three sizes: 12", 15", 18"

This model is intended for die sinking, bench work, and assembly of machine units when quick rotation and positioning are required.



STANDARD MODELS WORM WHEEL
OPERATED ROTARY TABLES

Five sizes: 9", 12", 15", 21"

For die sinking, jig boring, cam milling. Indispensable in wood and metal pattern shops.



HEAVY DUTY MODELS WORM WHEEL
OPERATED ROTARY TABLES

Three sizes: 18", 21", 25"

These larger, heavy duty models are used for jig work, planer jobs, and on horizontal boring mills.

DIVIDING ATTACHMENTS or DRILLING ATTACHMENTS can be furnished.

See Your Dealer or Write to us for
Complete Catalogs.



TROYKE MFG. CO.

CINCINNATI 9, OHIO

lift the slide. Die cushions are telescoping and internally guided.

The standard inclining arrangement includes three fixed positions; namely, vertical, 15 degrees and 30 degrees. The combination air-operated friction clutch and brake features a multiple disc clutch and brake in a single synchronized unit having one moving part engaging the clutch by air pressure in one direction or applying the brake by spring pressure in the other direction. Engagement is on 360 degrees under

uniform pressure. The press also features a standard slide stroke of 4 inches with 90 or 120 strokes per minute on the flywheel type and 40 strokes per minute on the geared type.

★ ★ ★

Package Filtration Unit Handles 9,000 Gallons of Water Per Hour

A package filtration unit which is said to be capable of handling up to 9,000 gallons of water per hour, allowing deductions of 50 per cent for friction losses, has

been announced by The Ruthman Machinery Co., 1817 Reading Rd., Cincinnati 2, Ohio. The unit, illustrated here-with, consists of the Rumaco Model 2-C All-Bronze Pump and a Cuno Model 3-AX-3 Filter. The driving motor of $1\frac{1}{2}$ h.p. at 3,450 r.p.m. is available for any current required, for domestic or industrial applications.

only FEDERAL has
so many big features!

• Patented Brake Design. Automatic release, if desired.

• Solid Web-Type Flywheels. An important safety factor.

• Non-Repeat Clutch. A feature exclusive with Federal.

• Timken Bearing Flywheels. Eliminate wear on shaft.

• Longer "V" Ways, Gibs. Hand-scraped to perfect alignment.

- OVERSIZED CRANKSHAFTS
- GENEROUS SHUT HEIGHT
- FRONT OPERATED RECLINE



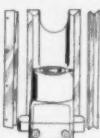
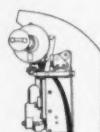
No. 7 Flywheel type. Capacity, 80 tons

Here are important features that give FEDERAL users a definite edge, production-wise and cost-wise. These rugged, precision-built presses boost output, eliminate accidents. Offered in four major classes—from 6 to 95 tons. Write for new catalog today!

THE FEDERAL PRESS COMPANY
504 Division Street, Elkhart, Indiana

FEDERAL PRESSES

30 Years of Quality Construction



Rumaco Package Filtration Unit



**SURE
WISH
I'D 'A' GOT
ACE DRILL BUSHINGS**

MORAL: FOR BETTER BUSHINGS—
Always Specify ACE!

LARGEST DELIVERABLE STOCKS ANYWHERE



ACE DRILL BUSHING CO., INC.
5407 Fountain Ave., Los Angeles 29, Calif.

REID

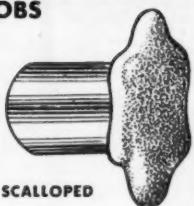
TOOL ROOM ACCESSORIES

C.I. HAND KNOBS

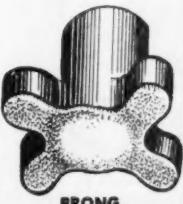


LONG SHANK
With Wrench Hex.

Three styles. Many sizes.
Made of fine grain cast
iron. Smooth finish. No
sharp edges. Low prices.
FREE 56 PAGE CATA-
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dozens of items needed
in tool room. Top
quality. Lowest prices.



SCALLOPED



PRONG

REID TOOL SUPPLY CO.
Muskegon Heights, Michigan

Raise it! Lower it!



Increase production...

RAYMOND PORTABLE ELEVATING TABLE

Keep materials at right height for working with a RAYMOND Portable Elevating Table. Elevates and lowers hydraulically—use it for die handling, sheet feeding, work positioning, supporting overhanging work.

30" square top rotates or locks when desired. Foot pedal operation frees hands. Floor lock holds it in place. Standard model elevates 28" to 44"; Telescopic model, 28" to 50". Both have 2,000 lb. capacity. Send for Portable Elevating Table bulletin.

The RAYMOND CORPORATION
3939 Madison St., Greene, N.Y.

Clamp Features Angular Flange Base for Easy Mounting

Identified as the 509 Series, a toggle clamp, hailed as a "fixture framer" and "forty-fiver," which features low silhouette, complete clearance of working area, flop-over action and a red vinyl plastic safety-ease handle grip has been announced by Detroit Stamping Co., 349 Midland Ave., Detroit 3, Michigan.

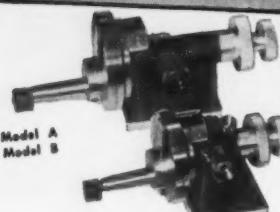
The clamp is called a "fixture framer" because of its angular-flange

base which permits easy mounting by bolts or welding to the side of the fixture. The term "forty-fiver" is applied because, when mounted vertically to the side of the fixture, the holding bar of the clamp flops completely over the side of the fixture to produce a positive firm clamping action at a 45-degree angle directly against upright fixture base.

The low silhouette of the clamp is said to be the fixture-hugging feature which is designed to bring ease and convenience for work insertion and removal. The complete clearance makes the unit ideal where sheets or components are positioned for light-duty processing.

The clamp is available in two models; namely the Model 509-U and the Model 509-S. The 509-U has a U-shaped holding bar and is especially recommended where welding facilities

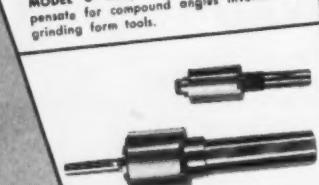
Improve Your Operating Efficiency, Quality and Profits with these LAST WORD Metal-Working Products!



LAST WORD WHEEL DRESSERS FOR RADIUS AND TANGENT ANGLE DRESSING — AVAILABLE IN 3 MODELS
MODEL A—For grinders using wheels up to 20" dia. MODEL B—For small model surface grinders with 7" max. wheel dia.
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SAMSON "Heavy-Duty" OFFSET BORING CHUCK—Has positive centering feature for drilling and milling operations. Complete accessories available.



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LAST WORD
GRAY-GRIMES
FLOATING DRIVER—For reaming, tapping, valve seating and similar operations. Can be supplied with standard or special shanks and adaptors.



GRAY-GRIMES
AUTOMATIC STEADY-REST—Permits grinding complete length of shaft maintaining constant pressure against work-piece as stock is removed.

Mfg'd by
Gray-Grimes Tool Co.

LAST WORD sales company

18500 MT. ELLIOTT (Dept. B) • DETROIT 34, MICH.



De-Sta-Co 509 Series
Toggle Clamps

MUMMERT-DIXON SWING FRAME GRINDERS

Sizes 12", 14", 16", 18", 20" and 24" wheels.



Ask for Descriptive Circular
MUMMERT-DIXON CO.
120 Philadelphia St. • Hanover, Pa.

**READING BENCH
KEYSEATER**

Portable—move directly to job; a time saver for both small and large shops.

3½" stroke; adaptable for other work.

Low first cost—prompt delivery.

Good dealers wanted.

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**MORE PARTS
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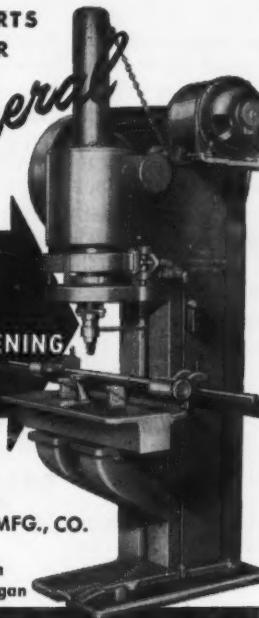
General

**FLEXIBLE-
POWER
STRAIGHTENING/
PRESSES**

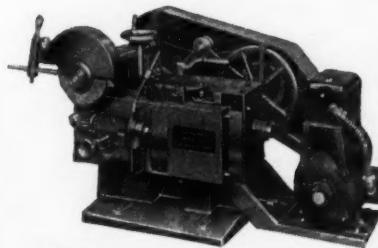
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Prove It!*

General MFG., CO.

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Detroit 11, Michigan



Are You Cost Minded?



WARDWELL

Manufacturing Co.
3803 Ridge Rd.
Cleveland 9, Ohio

Maker of largest line of saw and tool sharpening machines

Then figure the enormous savings in saw sharpening costs and saw purchases, when a group of 40 to 150 saws can be ground at one time—with the WARDWELL Model 35T.

This recent development sharpens milling, slitting and screw-slottedting saws in gangs, in one setting . . . all size saws 2" to 5½".

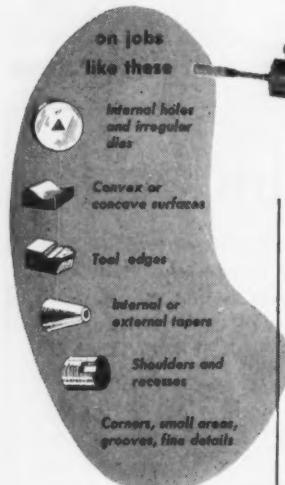
Completely automatic. Just start machine—it does the rest.

Reduce maintenance costs now with the WARDWELL 35T. Write for free bulletin No. 35T today.

are not convenient. The 509-S utilizes a solid carbon steel work-holding bar to which a wide variety of spindle assemblies may be attached. A cone-tipped adjustable spindle may be easily attached to the 509-U or welded readily to the 509-S. The 509 Series clamp is light and strong, with the 509-S having a holding pressure of 500 lb. and the 509-U with a holding pressure of 375 lb. Each model is available in both right and left-hand styles.

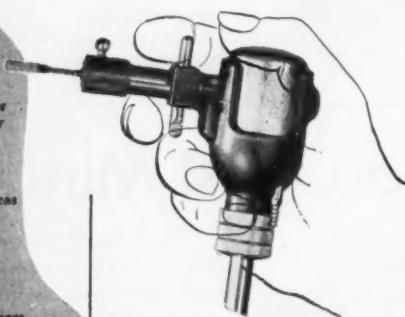
THE Di-Profiler RECIPROCATING HAND MACHINE

for time-saving cutting—roughing—finishing



Write for
free demonstration
or illustrated
price list
DS-255

Tools for
every type
of work
CUTTERS, FILES,
DISCS, POINTS,
BURRS, LAPS,
SCRAPERS



Variable speed and stroke Fast, precise, no vibration

An indispensable labor saver for die, tool and mold work, the Di-Profiler has a controlled stroke variable from 0 to 6 mm ($\frac{1}{4}$ inch) and a speed of reciprocation adjustable from 0 to 100 strokes per second.

The Di-Profiler is rapid, precise, easy to operate—simple and sturdy in construction. Its weight of less than one pound and freedom from vibration eliminate fatigue and assure perfect control for the most intricate work.

Moderately priced, the Di-Profiler pays for itself many times through time-saving cost reductions.

ENGIS EQUIPMENT COMPANY

Sole Authorized Distributor for the United States
431 S. Dearborn Street, Chicago 5, Illinois

Magnetic Base Features Universal Joint Swivel

The du Mont Corp., Greenfield, Mass., has announced that its "Minute Man" Magnetic Base is now equipped with a universal joint swivel to provide added convenience and time saving in positioning dial indicator gages. The swivel shaft is said to permit a 180-degree swing on a vertical plane and a 360-degree swing on a horizontal plane. According to the manufacturer,

the base does not have to be repeatedly repositioned in order to get various gage readings. The ball and socket arrangement is simply swung to any desired position and locked securely by a large knurled nut. The shaft fits into each of the three positioning holes in the magnetic base.



du Mont "Minute Man" Magnetic Base with universal joint swivel



insist on famous

"Jorgensen"
INC. - DAY OFF.

"C" CLAMPS

Also bar clamps, hinged
clamps, spring clamps, etc.

ASK YOUR SUPPLIER

Send For Free 32-Page Catalog
ADJUSTABLE CLAMP CO.
436 N. Ashland, Chicago 22, Ill.

JIG BORING

and

Large Precision Machining

Done to your specifications

We Have 13 Jig Borers

KIDDE PRECISION TOOL CORP.

37 FARRAND ST. BLOOMFIELD, N. J.

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STEEL
PRODUCTS

MACHINE KEYS

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TAPER PINS

the Quality Line
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KEYS-ALL TYPES • COTTER PINS
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MACHINE RACK • SPECIAL PARTS

KOOLHEAD Foundry Chill Nails

WRITE FOR
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STANDARD
HORSE NAIL CORP.
New Brighton, Pa.



TO BE SURE OF
QUALITY
Remember
the Name

HOGGSON

STEEL
STAMPS



**FINEST
STEEL**

long
life

ALSO IN
REVERSE
FOR
MOLDS
& DIES

Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

HOGGSON & PETTIS MFG. CO.
New Haven 7, Connecticut

Impact Wrench Features "Finger Tip Reverse" in Handle

Identified as the "SpeedWrench" No. 55, a $\frac{1}{2}$ -inch drive electric impact wrench which features a "finger-tip reverse" in the handle, as well as all the other features in Thor tools of the same type and capacity, has been announced by the SpeedWay Division of Thor Power Tool Co., Aurora, Ill. According to the manufacturer, the

"finger-tip reverse" in the handle, eliminating armature brush shifting, permits rigid armature support to de-



Thor "SpeedWrench" No. 55 Electric Impact Wrench

**Does jobs no drill can do! up to
10 Times Faster than Boring!**



5 ADJUSTABLE SIZES: Specify Straight Shank or M.T. 2, 3, 4. Other tapers on order.

Models:	102	203	304	405	506
Capacity:	1" to 2"	2" to 3"	3" to 4"	4" to 5"	5" to 6"

Order from your dealer or write for catalog!

ROBERT H. CLARK COMPANY
9330 Santa Monica Blvd., Beverly Hills, Calif.

velop unusual power and long motor life and further permits solid rear-end construction.

The wrench is rated for a standard capacity of $\frac{3}{8}$ -inch bolt size nut setting, with an extra capacity of $\frac{5}{8}$ inch. The tool is designed for use with standard $\frac{1}{2}$ -inch square drive wrench sockets and may be adapted for driving square end taps, round shank drills, reamers and other accessories.

★ ★ ★

Stainless Steel Blade for Combination Squares and Sets

Brown & Sharpe Mfg. Co., Dept. 43, Providence 1, R. I., has announced a 12-inch stainless steel blade which is said to provide definite advantages for

CASE HARDENING
WITHOUT SPECIAL EQUIPMENT
NON-POISONOUS • NON-EXPLOSIVE • NON-INFLAMMABLE

5 lb. - \$9.25 10 lb. - \$17.40 F.O.B. New York

Available at Leading Mill Supply and Hardware Houses

KASENIT COMPANY
799 GREENWICH STREET BOX G NEW YORK 14, N.Y.

*...for more than
1001 jobs*



HJORTH LATHE & TOOL CO.
8 BEACON STREET

WOBURN, MASS.

Tool Room MILLING MACHINE

\$149.50 with Chip Pan, Vise and Motor

Longitudinal Feed, 6".

Transverse Feed, 1½".

Vertical Feed, 4".

Also available in
larger sizes.

PRODUCTION MODEL

\$199.50

Write for
details.

SOUTHERN MACHINE TOOL CO., Conyers, Ga.



Hammond
OF KALAMAZOO

2 IN 1 NO-DUST GRINDER



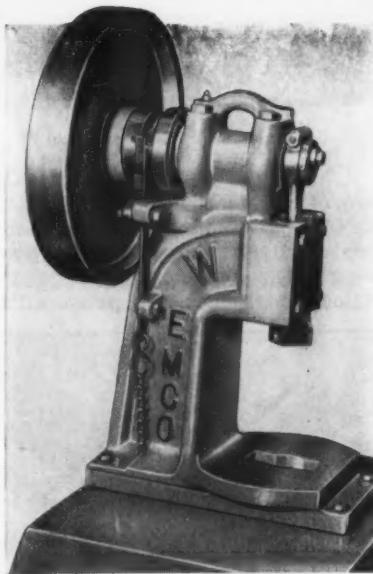
SAVE OVER 50% FLOOR SPACE
THE HAMMOND WAY



DUST-LADEN AIR IS A MENACE!

- Protect your employees' health.
- Protect nearby machine tools from dust and grit.
- Save floor space — requires only 6½ square feet.
- For 10", 12", and 14" wheels.
- Write for Catalog.

Hammond Machinery Builders
1615 Douglas Ave., Kalamazoo 54, Michigan



EMCO "W", bench type, 5-ton; also larger
EMCO "X", 10-ton. Both sizes also stand-
mounted. With or without motor drive.

EMCO POWER PUNCH PRESSES are SPEEDY and SAFE

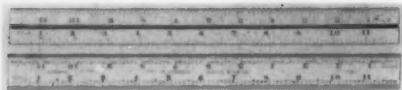
Versatile EMCO presses excel for punching,
forming, stenciling and riveting metal, leather,
plastics and other non-metallic materials. Up
to 300 operations per minute. "Big machine"
speed, strength, rigidity, accuracy, endurance.
Compact, fool-proof; simple design—easy to
operate. Thousands of EMCOS in money-mak-
ing use testify to Klaas' dependability since
1921. Ask for our Bulletin "S-2".

THE KLAAS MACHINE & MFG. CO.

4334 East 49th St.
Cleveland 25, Ohio

UNUSUAL
AIDS
TO
INDUSTRY

KLAAS-BUILT



Brown & Sharpe 12-Inch Stainless Steel Blade
for combination squares and sets

users of combination squares and sets. The black graduations on the smooth, stainless steel finish are easily read. The stainless steel is claimed to be protection against moisture, perspiration,

acid and corrosion-causing agents. This is said to assure a permanent, unvariable precise fit in heads.

★ ★ ★

Spindle Clamping Device for Thriftmaster Universal Joint Drill Head

A spindle bracket clamping device which makes the use of spindle locating and locking templates optional, has been developed by Thriftmaster Products Corp., 1034A N. Plum St., Lancaster, Pa. The clamping device, consisting of two clamping bolts per adjusting bracket, is used with the Thriftmaster 9-Spindle, Heavy-Duty Full Ball Bearing Universal Joint Type Adjustable Drill Head. This head has a capacity of $\frac{3}{4}$ inch in cast iron and requires a spindle clamping device ruggedly built to provide positive support for drilling such large holes.

Cut tool costs and inventories

NEWCOMER MECHANICAL TOOL HOLDERS AND CARBIDE INSERTS

ECONO-CLAMP TOOL HOLDERS

...for triangular, round & square carbide inserts

Newcomer Econo-Clamp Tool Holders provide a short-cut to economical production . . . machine down-time for tool grinding is minimized because multiple cutting edges on inserts can be utilized! Positive dual clamping features provide easy, quick and accurate indexing. Econo-Clamps use standard full-length inserts or the more economical, short Newcomer "Throwaway" Carbide Inserts together with a hardened steel base anvil. Newcomer Ad-Clamp Tool Holders are also available for use with standard rectangular blanks or the more durable Newcomer Step-Tip Blanks. Send today for Newcomer Catalog 109-54!

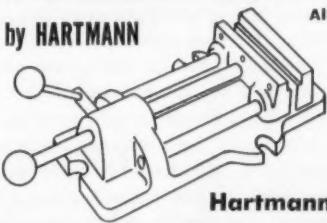
NP
NEWCOMER PRODUCTS, INC.
LATROBE, PENNSYLVANIA
General Sales Office: 512 Franklin Ave., Pittsburgh 21, Pa.



Thriftmaster 9-Spindle Universal Joint Type Adjustable Drill Head equipped with spindle bracket clamping device

INSTANT ACTION

by HARTMANN



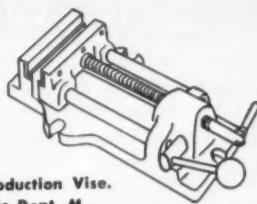
RAPIDSET

All Purpose Tool Room And
Machine Shop Vises.

The

JAWSET

Adjustable Pressure Production Vise.
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Hartmann Mfg. Co., 1637 Goold St., Racine, Wis.

WALTHAM SUB-PRESSES

... for precision work



Exact alignment and constant precision can be maintained throughout life of die. Made in 9 sizes. Babbitt bearing is tapered on outside and can be forced downwards. This reduces inside diameter to fit plunger when latter becomes worn through use.



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WALTHAM, MASS.

IF you must cut
production costs --
THEN without machining, you can:

Accurately locate and secure drill bushings,
Center and secure shafts in Alnico rotors,
Anchor spindles in abrasive wheels,
Locate and secure fittings in assembly frames,
Anchor sleeve bearings and non-moving parts in machinery.

Bulletin A1 shows how Cerro Alloys can save time and
money in above operations. Write for it today.

Visit Booth 558, A.S.T.E. WESTERN SHOW, Los Angeles, March 14-18, 1955,
to see these and other applications on display.



CERRO DE PASCO CORPORATION

Dept. 10, 40 Wall St., New York 5, N. Y.

Bench Comparator Utilizes Mechanical Indicator or Air-Probe

Designated as the STD-5, a bench comparator which can be adapted for many measurements utilizing the mechanical indicator or air-probe type of air equipment has been announced by Acra-ment Gage Division of Myer Corp., Park Ave., Cranston, R. I. According to the manufacturer, the 0.040-inch range and unusual stability of the instrument provide the control and accuracy required for its use with the

mechanical indicator or air-probe type of gaging operations. The column of the unit can be mounted under the platen and, using the hole provided in the platen, the sensitive interlock of either the indicator or air-probe can be mounted to accommodate many diversified measurement requirements.

The platen of the comparator is of hardened steel, surface ground and equipped with tipped holes for mounting special fixtures and locating devices. The base is of stress-relieved high-quality cast iron. Many different setups for measurement, it is claimed, may be accomplished with the gage. The over and under mounting fixture of the column is said to establish a large variety of variations in its usefulness. The indicator bracket will accommodate any A.G.D. design indicator or air-probe.

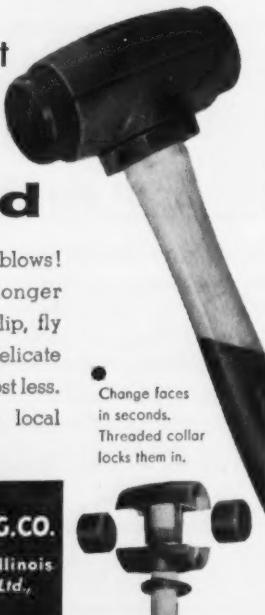
When you want a "soft" hammer
that's **BETTER, SAFER**
COSTS LESS AND
LASTS LONGER

That's when you want



Jawhead

They do more work with fewer blows! The secret—less rebound, longer striking contact. Faces won't slip, fly off, crack, or spark. Ideal for delicate parts, finishes. C/R Jawheads cost less. Buy C/R Jawhead from your local industrial supplier.



Change faces
in seconds.
Threaded collar
locks them in.

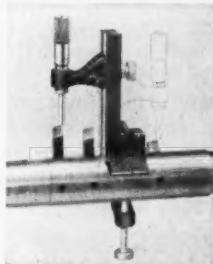


Acra-ment STD-5
Bench Comparator

CHICAGO Rawhide MFG.CO.
1301 Elston Ave. Chicago 22, Illinois
In Canada: Super Oil Seal Mfg. Co., Ltd.,
Hamilton, Ontario

SAVE TIME

With
Bartelt
Gages



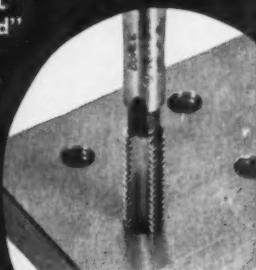
- Use a Bartelt Pedestal Micrometer for setting boring tools and for many other shop operations requiring accurate positioning relative to a fixed base. Make settings in one step — eliminate cut-and-try methods. Model B, with reversible slide, shown. Write for literature describing all models.

BARTELT ENGINEERING CO.
1216 PARTRIDGE AVE.
BELOIT • WISCONSIN

For PRODUCTION TAPPING AT ITS BEST

Use DoALL
"Engineered"

- Taps
- Complete stocks
- All kinds . . . all sizes
- High speed steel
- Special taps for special needs



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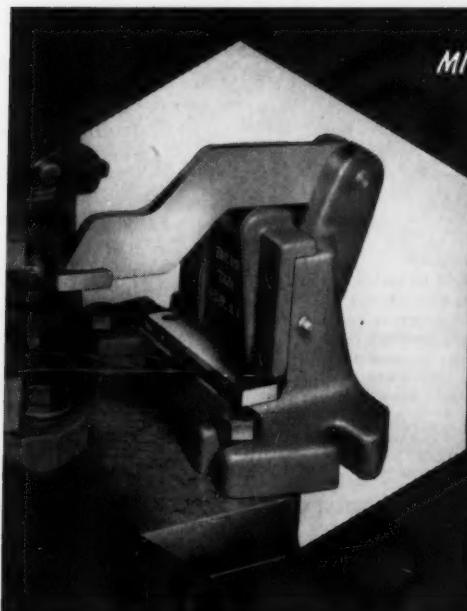
see classified directory for nearest DoALL Service-Store carrying complete stocks cutting tools, gages, supplies.

The DoALL Co.
Des Plaines, Ill.

Guaranteed

**None
Finer**

17



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A NEW DURANT SCRAP CHOPPER

A low cost scrap chopper operated by the press ram, independent of the die & without power. A tool steel blade gives a longer cutting life. These Durant units are easily bolted to press; handle any stock up to 3" wide & .062" thick, from any position. Whatever your needs may be there is a Durant chopper of proper size, capacity power and price.

Our free catalog gives complete information on a wide range of press room equipment.

DURANT TOOL SUPPLY CO.

136 So. Water St., Providence, R. I.

Plug Gage Has Tolerance of 0.00001 Inch

The Van Keuren Co., 175 Waltham St., Watertown, Mass., has announced an ultra-fine, plain plug gage tolerance of 0.00001 inch, designated as Class XXX. The new tolerance, one-half of Class XX, is claimed to meet demands for gages which will suit part limits finer than 0.0002 inch and to permit only ten millionths of an inch total variation on the gage in sizes up

to 0.825 inch in diameter and fifteen millionths in sizes from 0.825 to 1.510 inches in diameter. Tolerances may be applied either bilaterally or unilaterally.

Since a Class XXX tolerance must take into account finer diameter variation, roundness control of a high order, exceptional surface finish and extreme resistance to wear (all of which offset the shallow wear depth inherent in such a gage class), the Class XXX

is offered only in chromium plated and carbide gages. Class XXX gages are restricted to the following gage diameter ranges, materials and styles: wire-type tungsten carbide from 0.010 to 0.365 inch; wire-type chromium plated steel from 0.010 to 1.010 inch; taper lock chromium plated steel from 0.010 to 1.510 inch; and taper lock chrome carbide from 0.365 to 1.51 inch.



Improves Your Product
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Cuts Costs

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A comprehensive study of the application of a black oxide finish has been compiled and is now available in our latest catalog. The study also covers Black Magic Blackening Processes for other ferrous and non-ferrous metals; metal cleaners, rustproofing oils and waxes, plating specialties and a complete line of heat treating salts.

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QUALITY PRODUCTS OF CHEMICAL RESEARCH

THE MITCHELL-BRADFORD CHEMICAL CO.
2449 Main St. Stratford, Conn.



Van Keuren Class
XXX Gages



MARK OF QUALITY

STANDARD MACHINE KEYS



We are able to furnish the following types of finished machine keys of any size and taper: Gib head taper keys, Plain taper keys, Straight keys, Round end feather keys, and Tit keys. We can supply you quickly with the quantities you need at the specifications you require.

Send for new catalog giving complete information on Woodruff keys, taper pins, machine keys and machine racks.

STANDARD STEEL SPECIALTY CO.
BEAVER FALLS • PENNSYLVANIA
Plants: Beaver Falls, Pa.; Hammond, Ind.

DOALL GRANITE SURFACE PLATES

Non-Rusting • Non-Magnetic • Ultimate Accuracy • Cheaper Than Metal Plates

- Wear Free
- Shock Proof
- Harder than hardened steel
- Velvet Smooth
- Unsurpassed for Production, Inspection and Layout Work

SIZES SHAPES AND ACCURACIES FOR EVERY REQUIREMENT

Consult your yellow directory for location of nearest of the thirty-eight DoALL Sales-Service Stores that stock complete metal working necessities.

Call or Write
The DoALL Co.



People work better when they SEE BETTER MAGNI-FOCUSER



At SKF Industries, Inc.
Magni-Focuser helps in conversion of wire into "points" for ball-point pens.

MAGNI-FOCUSER's

matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

SPEEDS PRODUCTION
With Third Dimensional (3-D) Vision
Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

EDROY PRODUCTS CO.

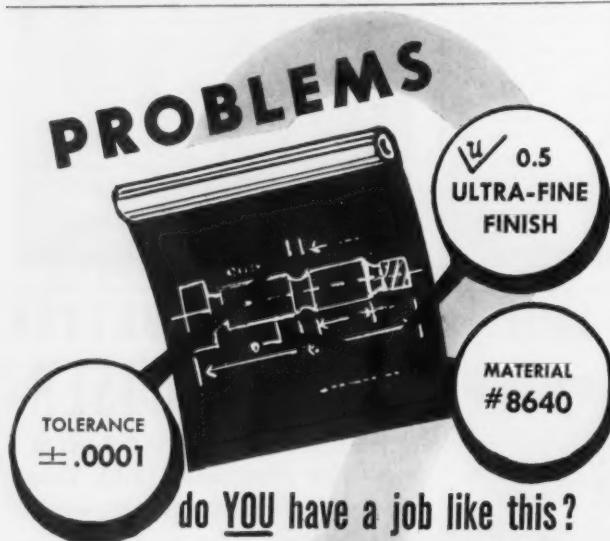
480 Lexington Ave.,
Dept. P, New York 17, N. Y.

High Speed Drill Press Drills Holes from No. 80 to $\frac{1}{4}$ Inch

Designated as the Model "P," a high speed drill press for the production drilling of holes from No. 80 to $\frac{1}{4}$ inch in small parts has been announced by Precise Products Corp., 1345 Clark St., Racine, Wis. The drill press utilizes a Precise Super 30 Power Unit having a direct motor drive with 1/5-h.p. maximum output and a wide speed range of from 100 to 45,000 r.p.m. The

unit is said to be capable of drilling materials ranging from mild steel to aluminum and zinc alloys, brass and copper, and from glass to plastics, pressed wood and wood. The drill head is adjustable vertically along the steel column and may be turned through 360 degrees for small angle milling operations. Table travel is said to be securely and precisely maintained through two separate guide posts. An adjustable stop is provided for table travel.

The machine incorporates a one-piece precision ground quill and collet chuck which is supported on two oversized precision bearings. The chrome finished aluminum alloy housing has machined surfaces to assure accurate mounting. The maximum distance from the chuck to the table is 6 inches,



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Quarter of a century of Centerless Grinding and Screw Machine Service. • Complete facilities include Heat Treating — Plating — Close Inspection.

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PORTER MACHINE CO. INC.

3100 ENYART AVE. - CINCINNATI 9, OHIO



Precise Model "P"
High Speed Drill
Press



Combines $3\frac{1}{4}$ " longitudinal and $3\frac{1}{4}$ " transverse movements with circular movement of $7\frac{1}{2}$ " Rotary Table. • Rotary Table and Compound Table can be used separately. • Larger No. 2 Compound Table also available.

WRITE FOR BULLETIN

Rotary Tables • Multiple Spindle Index Centers • Vises • Screw Head Slotters

The John B. Stevens Company
Main Street, Somersville, Conn., U. S. A.

DoALL 2" Utility Monolight ... provides featherweight portability

- Checks surface flatness in millionths
- Ideal for use at production machines
- Perfect for roving inspectors
- Detachable head

Call DoALL — consult your classified phone directory for nearest DoALL Sales-Service Store stocking cutting tools, gages, supplies—or Write



The DoALL Co.
Des Plaines, Ill.

29

Enco Self-Indexing **HEXTURRET**

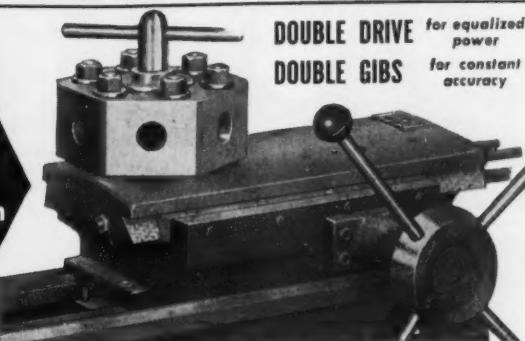
For Lower Production
Costs and Speedier
Output

- ✓ Custom built to fit all lathes from 9" to 18".
- ✓ All bearing surfaces hand scraped.
- ✓ Smooth, sensitive control with Pilot wheel drive through twin gears and racks.
- ✓ All parts of indexing mechanism hardened, assuring accuracy.

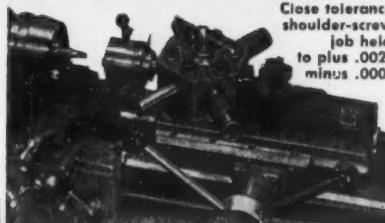
Manufacturers of the most complete line of Hexturret Bed Turrets, Turret Tool Posts and Tail Stock Turrets in the Country.
Send for Latest Catalog.

ENCO Manufacturing Co., Dept. 125

4324 W. FULLERTON AVE., CHICAGO 39, ILL.



DOUBLE DRIVE for equalized power
DOUBLE GIBS for constant accuracy



Close tolerance shoulder-screw job held to plus .002; minus .000.

Reasonable Deliveries

and the table lifts $1\frac{1}{2}$ inches up. The drilling machine has a 4-inch diameter table.

★ ★ ★

T-Slot Bolt Has Concave Head

Standard Parts Co., 1000 Broadway, Bedford, Ohio, has announced a T-slot bolt which features a concave head designed to automatically clean out the slot as the bolt travels on the work table. The concave head, it is claimed,

pushes dirt and chips to the center of the slot instead of to the sides, thus avoiding jamming or binding. The bolt is heat treated to give maximum strength, coined after forging to assure precision surfaces, centerless ground with full deep cut threads and given a special "blue-black" rustproof coating. According to the manufacturer, the bolt is made of S.A.E. 4140 steel, austempered to a Rockwell C scale range of from 42 to 45, providing a tensile strength of 200,000 pounds per square inch.

The T-slot bolt is available in the following sizes: $\frac{1}{2}$ inch diameter, from 2 to 18 inches long under the head; $\frac{5}{8}$ inch diameter, from $2\frac{1}{2}$ to 18 inches long under the head; and $\frac{3}{4}$ inch in diameter, from $2\frac{1}{2}$ to 24 inches long under the head. The bolt can also be supplied in $\frac{7}{8}$, 1, $1\frac{1}{8}$ and $1\frac{1}{4}$ -inch diameters.



"We Consider
DY-NAMIC BALANCING
absolutely necessary for
HIGH SPEED Rotating Parts"

says G. Selig, vice-president and plant manager of Remsen Industries, Chicago, Illinois, where this "Bear" Dy-Namic Balancing Machine is used to balance impellers.

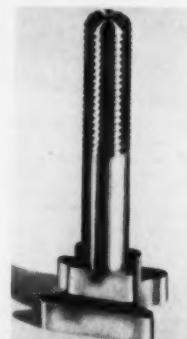
The need for Dy-Namically Balancing every rotating part—especially those that spin at high speeds—is being recognized in every phase of industry. Select the "Bear" Machine that fits your budget and your operation from the...

free DY-NAMIC BALANCING MANUAL!

Tells how you can easily, quickly, economically balance rotors, armatures, crankshafts, and any other part that turns, weighing from 4 oz. to 8 tons! See how to reduce wear, eliminate noise and vibration, improve all-around performance of finished product. Your copy sent without cost or obligation. Bear Mfg. Co., Dept. M-25, Rock Island, Ill.

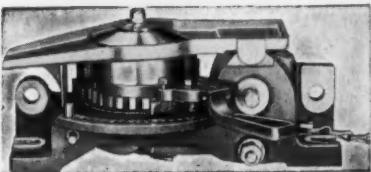


6038



Standard T-Slot Bolt

MODEL H AUTOMATIC Chuck & Indexing Fixture



1. 1800 light cuts per hour.
2. Either horizontal or vertical position.
3. Collets changed instantly.
4. Automatically knocks piece out.
5. Ratchet or degree indexing — degree indexing added later if desired. Capacity 1".
6. Automatic indexer also added later. Model F—Both degree and ratchet indexing. Capacity up to 2½".

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J. W. DEARBORN • Ansonia, Conn.

DoALL BLACK GRANITE STRAIGHT EDGES Made Accurate • Stay Accurate

Harder than
glass
Smooth • Rigid

Not affected
by
temperature
or humidity
changes

Call DoALL

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phone directory
for nearest DoALL
Service-Store. For
granite surface
plates, straightedges,
parallels and V-blocks;
gages, cutting tools,
supplies —
or Write

The DoALL Co.

Des Plaines, Illinois

24" to 72"
lengths

.00005"
accuracy

27



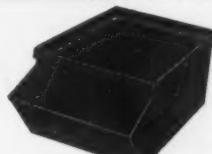
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THESE BOXES AGAINST ANY!

Once you use and compare Sterling stacking boxes, you'll know why we invite comparison in design, construction, and price. Our "Top Rim" construction provides stronger support all around the box . . . no corner inserts to become loose and fall out. Efficiency in designing and manufacturing allows us to quote favorably on any type or size stacking box.

Write for literature and prices.

Sterling Factory Equipment Co., 183 Charles St., Providence, R. I.



Sterling Bin Front "Top Rim"
Steel Stacking Box.
Size: 18" x 12" x 6".



Sterling "Top Rim" Steel Stack-
ing Box with drop handles.
Size: 18" x 12" x 6".



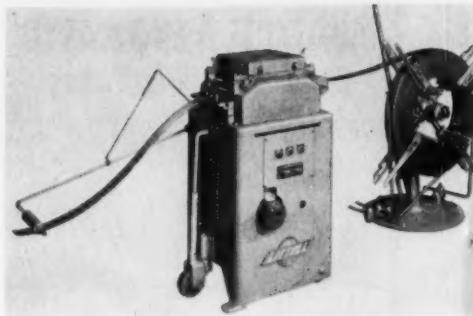
Sterling

Quality Handling & Storage Equipment

Variable Speed Straightener Has 17 Power-Driven Straightening Rolls

Designated as the No. 208, a variable speed straightening machine for handling ferrous and non-ferrous stock that features 17 power-driven straightening rolls has been introduced by F. J. Littell Machine Co., 4163 Ravenswood Ave., Chicago 13, Ill. According to the manufacturer, thin coil stock comes through the straightening rolls with the curvature removed, ready for automatic feeding to the press. The variable speed drive, it is claimed, permits easy adjustment of straightening speed to the speed of the press.

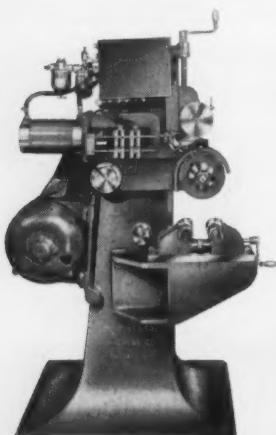
The machine is also said to be effective in removing the curvatures from flat parts induced by stamping operations. Parts up to 3/32 inch thick are straightened as they pass through the 17 power-driven rolls on 1½-inch cen-



Littell No. 208 Variable Speed Straightening Machine

ters. Contact springs, condenser plates, radio and television parts and adding and calculating machine parts are typical of the many flat-surfaced thin metal parts which the machine is capable of handling. The machine is portable and can be easily moved around the shop.

**NOW! CUT UP TO 1,000 PIECES
OF PIPE PER HOUR • • •**



CONTINENTAL CUT-OFF MACHINES

Cut Pipes and Tubes faster with Continental High Speed Cut-Off Machines. Lowest maintenance means less cost to you. $\frac{3}{8}$ " to 12 $\frac{3}{4}$ " O.D. capacities, hand or automatic air-operated bench and floor models. Request free catalog.

Continental MACHINE CO.
SINCE 1919
1952 N. MAUD AVE. • CHICAGO 14, ILL.

Coolant System Utilizes Mist for Cooling

Identified as "Mistic Mist," a coolant system which cools by the expansion of compressed air, the evaporation of minute liquid particles and the circulation of air has been announced by Aetna Mfg. Co., 188 S. York St., Bensenville, Ill. Mist is generated at the tip of the nozzle and is regulated by a simple needle valve in the air line which is mounted on the coolant container. The small nozzle and the small, flexible tubing are held in place by a clip and magnet which is said to make location and adjustment quick, secure and simple. Three nozzle clips for permanent installations are also supplied.

Ordinary shop air pressure is used, the system requiring only from 25 to 30 pounds pressure. Air consumption, it is claimed, is about 0.04 cubic feet per minute, and one gallon of coolant mixture under normal usage is sufficient for approximately 14 hours of operation. According to the manufacturer, only a trace of moisture remains when using Mistic Mist, making it ideal for use with jig borers, metal band saws, power hack and slitting saws, drill presses, milling machines, lathes and other machines. The sys-



Aetna "Mistic Mist" Coolant System

3-D MAGNIFICATION

For Inspection and
Small Assembly Work

with

Bausch & Lomb
Stereomicro-
scopes

Three
dimensional
vision

Unreversed
image

Speeds work

Requires
less skill

Call DoALL — consult
yellow directory for near-
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that stocks cutting tools,
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The DoALL Co.
Des Plaines, Ill.



Makes little
parts look
big!

AUTOM



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Manufactured by

AUTO MOULDING
& MFG. CO.

WRITE FOR CATALOG

1114 E. 87TH ST. CHICAGO 19

tem is said to eliminate coolant pumps and pans, wet hands, wet floors and wet clothing.

• • •

Portable Tester Makes Brinell Tests on Non-Ferrous Alloys

A portable, lightweight hardness tester designed to make accurate Brinell tests on non-ferrous alloys of all kinds has been developed by Andrew King, 67 E. Lancaster Ave., Ardmore,

"Get them from Gillen"

MACHINE KEYS

**Standard Gib Head and Plain Taper Keys,
Straight and Round End Feather Keys.
Precision milled, C-1018 Steel; close
tolerances; completely de-burred, ready
for assembly.**

MACHINE PARTS

Every shape and size; milled, drilled, tapped, countersunk, counterbored, heat-treated, surface ground, from various metals. Used by leading machinery builders. Precision made, rigid inspection.

KEYS • PARTS • PINS

GILLEN GROOVE PINS

Just drill hole, Drive in pin. 3 grooves compress pin for tight fit. Stocked many lengths and diameters. For fast, production fastening. Eliminate threading, tapping, reaming. Various metals and finishes.

TAPER PINS

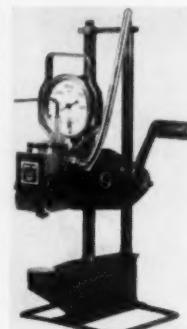
Straight to taper, $\frac{1}{4}$ " per foot. Extremely accurate. Milled from bar stock; also centerless ground. Rust-resistant coating. Stocked many lengths and diameters.

John Gillen Company
Manufacturers
2542 S. 50TH AVE., CICERO 50, ILLINOIS



Pa. The tester features a removable test head which is said to make it possible to test parts of any size or shape, and the precision instrument can be used in any position, even upside down, with or without the base. The unit can be set to pop off at 62½, 125, 250, 500, 750 and 1,000 kg. Both 5 and 10-mm. balls are used for various applications, and where a small impression is desirable, a 5-mm. ball with a 750 kg. load will cover the same hardness range as a 10-mm. ball and a load of 3,000 kilograms.

The hardness tester has a narrow and shallow nose at the anvil so that it can be used in small, cramped spaces, tubes or cylinders. The throat of the unit is 4 inches deep and the gap is 10 inches high with either the 5 or the 10-mm. ball. The entire unit weighs only 26 pounds.



King Portable Hardness Tester

Sawing Machine Has Capacity for Cutting 43-Inch Diameter Aluminum Billets

Identified as the Model No. 5, a high speed circular sawing machine with a capacity for cutting 43-inch diameter aluminum billets has been announced by The Motch & Merryweather Machinery Co., 888 E. 70th St., Cleveland 3, Ohio.

The machine features a steel gear case housing a heavy-duty helical



Motch & Merryweather Model No. 5 High-Speed Circular Sawing Machine

gear train mounted on preloaded roller bearings. The saw head ways have non-metallic wear strips and forced feed lubrication.

Variable saw feed is claimed to be accomplished by means of a hydraulic cylinder. The drive of the gear case is through multiple V-belts and pulleys by a 150-h.p., d.c., totally-enclosed motor, operated by an a.c.-d.c. motor generator set, giving variable speeds within an 8 to 1 ratio.

Ample clamping of large stock is

DoALL "CLAW-TOOTH" SAW BANDS

Cut Faster • Last Longer

- Teeth pull themselves into work.
- Cut metals, woods, plastics
- For all contour and cut-off bandsaws
- An "all-purpose" blade

DoALL has it
In stock!

Consult yellow directory for DoALL Sales-Service Store near you . . .

Call or Write
The DoALL Co.
Des Plaines, Ill.

2, 3, 4, 6 pitch
 $\frac{1}{4}$ " to $1\frac{1}{2}$ " widths
100 ft. coils
or cut and
welded lengths



Rivet Spinning on the **LINLEY** is fast, low in cost and noiseless



Save time and money by putting your riveting on the LINLEY RIVETER. Send us samples of your work and we'll gladly and without obligation give you estimates on the time and cost of handling your work the LINLEY way.

Available in sizes and types for iron and cold rolled steel rivets up to $3\frac{1}{8}$ "; larger rivets of softer materials can also be handled.

Send for Bulletin R TODAY!

LINLEY BROTHERS CO.
671 State St. Ext., Bridgeport 1, Conn.

said to be provided by a heavy upper clamp and gooseneck, holding the stock against V-blocks in the lower vise. Elevating screws, connected across the top of the housing, furnish movement to the upper clamp. Powered roller conveyors extend on both sides of the vise. Each section can be elevated independently to facilitate movement of the stock and can be reversed if desired.



Small Motor High Starting Torque

Identified as Barcol YAF, a high power, unidirectional small motor has been announced by Barber-Colman Co., Small Motors Division, 6511 Rock St., Rockford, Ill. Said to combine high starting torque with exceptional power output, the motor is available in three stack thicknesses and nine power ratings from 1/200 to 1/40 horsepower.

power. Other features of the motor include large oil reservoir, alignable oil-impregnated porous bronze bearings,



Barcol YAF High Power, Unidirectional Small Motors

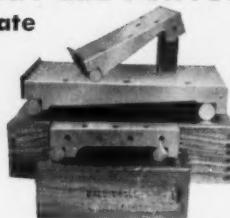
a selection of mounting arrangements and stainless steel hardened and ground shafts. Typical power applications for the motor include industrial instruments, fans, small pumps, animated displays, toys and many other devices and appliances.

- • • • •
-
-
-
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-
- **ROLLER THRUST BEARINGS**
- Made with flat seats and in various self-aligning types, especially adapted for heavy loads at slow or moderate speeds.
- STANDARD SIZES ARE SHOWN IN OUR GENERAL CATALOG, SENT UPON REQUEST.
- SERVING INDUSTRY FOR OVER 43 YEARS.
- THE GWILLIAM CO.
- 358 FURMAN ST. • BROOKLYN 1, N. Y.
- • • • •

ACCURATE—LOW COST SINE BARS and PLATES

**5" Sine Plate
only
\$37.50**

- Guaranteed Accuracy
- Precision Ground
- Hardened Rolls
- Double Normalized
- Tapped Holes
- End Plates
- Solid Oak Case Extra
- Immediate Shipment



No.	Cent. Dist.	Width	Price	With Oak Case
1605	5"	3"	37.50	43.00
1610	10"	5"	87.50	95.00
1705	5"	10"	21.75	25.25

FOB St. Paul.

Accurate to .0002" in center distance and parallelism for the length of the tool. Order Today—from your dealer or direct.



Bald Eagle Tool Co.

Newton Building, St. Paul 1, Minn.

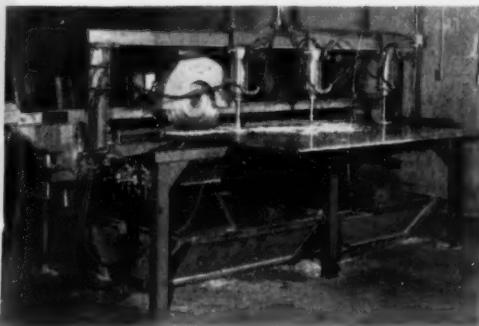
Saw Cuts Aluminum Plate up to 5 Inches Thick by 9 Feet 6 Inches Long

Meiermatic Saw Division, Meier Brass & Aluminum Co., 1471 E. 9 Mile Rd., Hazel Park, Mich., has announced a sawing machine which has a capacity for cutting aluminum plate up to 5 inches thick and up to 9-feet 6-inches long in any width. Maximum thickness of other materials is said to be dependent upon their machinability.

According to the manufacturer, the machine features automatically adjusting air cylinders which are designed to provide uniform clamping pressure which can be adjusted up to 5 inches in thickness. The cutting motor is of the 10-h.p., geared-in-head induction type, and the arbor speed is 2,150 r.p.m. with a 1-inch arbor. The maximum blade diameter the machine can accommodate is 22 inches.

A safety device which automatically cuts electric power to the saw should the air pressure drop below safe minimums for positive clamping is provided. The stop-start and air compressor control switches are conveniently located at the operator's position.

Designed to cut unwieldy plates or slabs on a production basis, the machine occupies a floor space which measures 55 x 110 inches.



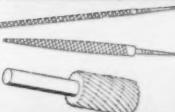
Meiermatic Circular Sawing Machine

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and produces aerated
coolant using atmos-
pheric air. Good for all
cutting and grinding
operations.

#700 Mel-O-Flo COOLANT-AERATOR for Low Pressure Centrifugal Pumps \$17.50

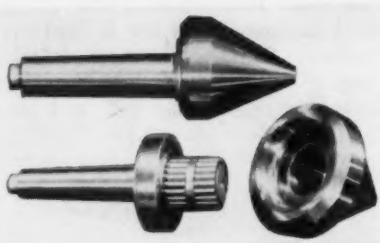
#600 Mel-O-Flo COOLANT-AERATOR for Gear or Vane Coolant Pumps or Central Systems \$17.50

The above models with 12" Flexible Hose.
Other hose lengths also available. Write for Full Details.

MELARD MFG. CO. 432 AUSTIN PL., N.Y. 55

Heavy-Duty Live Center Features Close Coupled Design

Trurol Bearing Co., 842 Mandana Blvd., Oakland 10, Calif., has announced a heavy-duty live center which features close coupled design, independent bearings and wide range of use. The Nos. 4 and 5 Morse taper centers shown herewith have a $4\frac{1}{4}$ -inch diameter cone hardened throughout. The cone applies the cutting load to a pre-loaded radial bearing which is said to



Trurol Heavy-Duty Live Centers

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Star Dust
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companying illus-
tration, is for tub-
ing having a hole
from 1 inch mini-
mum to 4 inches
maximum. A
shaft center is
made in this de-
sign also and has
a spring-loaded
thrust bearing
with a $\frac{1}{8}$ -inch
travel to take
care of the shaft-
ing heat. A bear-
ing overload pro-
tection is provid-
ed should the
maximum loads
be exceeded. Com-
mercial centers
are made with
a total runout

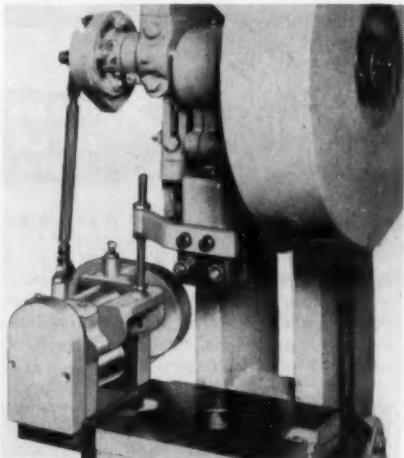
not exceeding 0.001 inch. Precision centers are supplied with a total run-out not exceeding 0.0002 inch.

* * *

Lifters Increase Efficiency of Benchmaster Automatic Friction Roll Feeds

Benchmaster Mfg. Co., 1835 W. Rosecrans Ave., Gardena, Calif., has announced that all of its roll feeds are now equipped with roll lifters as standard equipment. With this addition, rolls are separated slightly after each feed stroke is completed, thus releasing tension on stock between the press and the coil supply. According to the manufacturer, the lifters are of special value when feeding to piloted dies, on many progressive operations and jobs where accuracy is essential.

The automatic friction roll feeds are available in 3, 5, 7 and 9-inch roll widths, in 0 to 3-inch and 0 to 6-inch cut-off stroke lengths. Rolls can be supplied plain, knurled or rubber covered.



Benchmaster Automatic Friction Roll Feed with lifter installed on press

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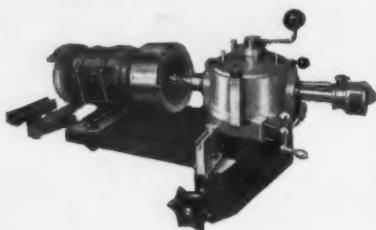
- Fire Hazards • Toxicity
- Dermatitis • Degreasing

Write for free sample and brochure.

PRODUCTION SPECIALTIES, INC.
755 BOYLSTON STREET
BOSTON 16, MASS.

Grinding Fixture Sharpens End Mills

Spiral Step Tool Co., 5400 N. Damen Ave., Chicago 25, Ill., has introduced



Spiral "Multi-Spiral" End Mill Grinding Fixture

a self-contained end mill grinding fixture, designated as the "Multi-Spiral," which is said to make it easy to sharpen end mills completely right in the shop. The detachable head of the fixture may be removed and used in combination with cutter-grinders and

milling machines for spiral milling, flute grinding, step grinding tools, web thinning and other similar operations. Radial relief grinding, it is claimed, can be accomplished by grinding inside the wheel, and spiral lips and ends can be finish ground in one operation.

According to the manufacturer, left-hand mills can be ground as easily as right-hand tools, and an end mill can be ground with a slight taper, making it possible to mill parallel slot. The fixture utilizes a hardened spindle and hardened bearing bushings. The spindle has a 1-inch hole. The fixture measures 31 inches long x 18 inches wide x 16 inches high and weighs 85 pounds.

★ ★ ★

Gage Block Set Contains All Accessories for Complete Gaging System

A heavy-duty, 84-block gage set which is said to contain all accessories

10" — 12" UNIVERSAL DIVIDING HEADS WITH DIRECT INDEXING



Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

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necessary for a complete gaging system has been announced by Webber Gage Co., 12899 Triskett Rd., Cleveland 11, Ohio. Claimed to be accurate to within plus or minus four millionths of an inch, the gage block set is designed to meet all requirements of the majority of manufacturers of precision products. It contains fixtures which will assemble the blocks for use as dividers, scribes and height or snap gages, in addition to their normal gaging function.

The gaging fixtures are said to



Webber All-Purpose Heavy-Duty 84 Gage Block Set

eliminate the use of screws, thus enabling gaging surfaces to remain free of all holes or other obstructions which might interfere with the accuracy of measurements.

The heavy-duty blocks, it is claimed, can be assembled into almost any desired length without the use of any accessories, and the complete assembly becomes, to all intents and purposes, a single gaging block. Individual blocks are $\frac{1}{2} \times 1\frac{1}{2}$ inches to ensure maximum resistance to wear.

DoALL ENGINEERED HSS CUTTERS

Increase Milling Production because:

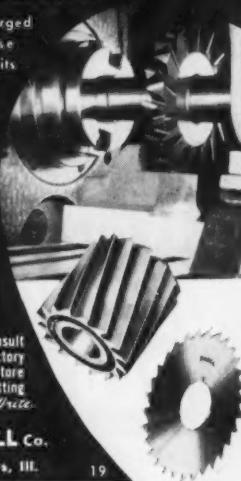
- Made from forged blanks—dense structure permits finer edges.
- Vapor blasted to remove burrs, increase life.
- 64-65 "C" scale hardness guaranteed.

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Every manufacturer,
design and production
man should have this valuable
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Machine Drills Vertical and Radial Holes Simultaneously

Originally designed by the Govro-Nelson Co., 1933 Antoinette, Detroit 8, Mich., for the drilling of radial holes, the machine illustrated herewith has recently been changed to provide vertical drilling in addition to radial drilling. This has been accomplished by incorporating in the machine a vertical bracket which holds an automatic

drilling unit with a multiple head, enabling it to drill five radial holes and two vertical holes simultaneously.



Govro-Nelson Vertical and Radial Drilling Machine

RAYMAC Solid Carbide DRILLS and REAMERS

Raymac drills cut hardened metal . . . do not burn or anneal. Feature operational speeds of 350 to 600 RPMs depending on size and hardness of metal.

Raymac solid carbide reamers are custom designed for individual jobs.

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RAYMAC
MANUFACTURING COMPANY INC.
3729 CASS AVENUE, DETROIT 1, MICH.

While it is a standard machine, the great variety of ways in which the drilling units may be arranged enables it to be used for many different special drilling operations. For example, the drilling units may be stationed around the circular table in any position required by the part being drilled, and they may also be moved endwise on riser plates.

When equipped with Govro-Nelson tapping units, it becomes a tapping machine of wide versatility. The machine has a range of 1/32 to 1/8 inch on drilling operations and 0-80 and 3/16-16 on tapping operations.



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Adds greatly to the safety of your shop • Provides safe non-slip footing • Absorbs oil and grease • Lessens fire hazard because, unlike saw dust or wood shavings, it is non-inflammable • Every shop needs this low cost safety aid.
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TAMMS INDUSTRIES, INC. 228 N. LA SALLE ST. CHICAGO 1, ILL.

Grinder Sharpens Single-Flute Milling or Engraving Cutters

Designated as the Model MT-1100, a cutter grinder which is designed for the precision sharpening of single-flute milling or engraving cutters has been announced by Johnson & Bassett, Inc., Production Tool Division, Box 1251, Worcester, Mass. The machine requires a working space measuring only 15 inches square x 14½ inches high.

A built-in diamond wheel dress-



Johnson & Bassett Model MT-1100 Cutter Grinder

er is mounted on the wheel guard, allowing the wheel to be dressed without disturbing the tool head. Four super-precision ball bearings are said to eliminate end play in the sealed spindle, and the sliding sleeve is dustproof. The machine incorporates a rocking head which is accurately controlled by means of a convenient thumb screw in the base.

The index plunger and dial in the tool head accommodate indexing one, two, three or four sides, as well

DoALL Precision
Tool and Die Steel
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6605 CEDAR AVE Phone EN 1-3412 CLEVELAND 3, O

as flats. The grinder utilizes a standard spring collet which receives cutter shanks up to $\frac{1}{2}$ inch in diameter. A special tool head for sharpening ball-nose, as well as regular, single-flute cutters can also be supplied.

★ ★ *

Jig Vise Affords Precision Drilling at Production Speed

Rynd Tool Co., Inc., Meadville, Pa., has introduced a jig vise which is de-

signed to afford precision drilling at production speed. Said to be accurate to 0.0003 inch, the vise can easily be set up by the machinist or drill press operator in a few minutes. Standard gage blocks are used to establish the locations of the drill bushings to an accuracy of less than 0.001 inch, and precision bushings guide the drill or reamer on dead center. The unit can be used as a universal drill jig or as a precision grinder vise.

The jig vise is supplied in a sturdy, attractive wood case and includes a hardened and ground vise



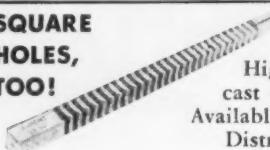
- with *Minute Man*



KEYWAY BROACH KITS

Cut any size keyway from $\frac{1}{16}$ " to 1" in any bore from $\frac{1}{4}$ " to 3" — by hand, with arbor press. Save setting-up time on a big, expensive machine tool.

SQUARE HOLES, TOO!



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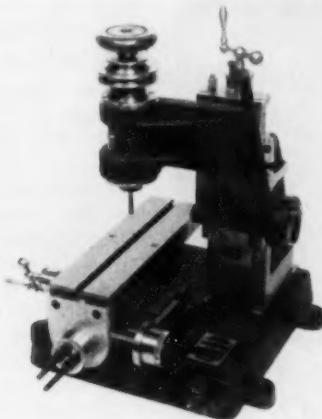


Rynd Jig Vise

with quick release nut and a jaw opening of $1\frac{3}{4} \times 3 \times 4$ inches; an adjustable stop rod assembly; a precision hardened and ground V-block; two pairs of bushing bars; three pairs of precision dowels; three pairs of precision bushings ($\frac{1}{8}$, $\frac{3}{16}$ and $\frac{1}{4}$ inch); and screws, washers and wrenches.

Redesigned Precision Mill Utilizes Four-Position Stops

F. W. Derbyshire, Inc., 157 High St., Waltham, Mass., has announced that its Vertical Micromill has been redesigned to include four-position stops to provide the operator with four positions in each direction. According to the manufacturer, the stops also provide a means for accurate hole location quickly on small jig boring operations. The Micromill is capable of handling drilling, reaming, tapping,



Derbyshire Redesigned Vertical Micromill

counterboring, spot facing and grinding operations, in addition to milling. On jobs where it is desired to space a number of holes accurately, the stop can be set and the workpiece centered to the drill or the cutter.

Another improvement in the machine is a new headstock with preloaded duplex bearings. With speeds up to 20,000 r.p.m., the manufacturer claims a spindle runout of less than 0.0001 inch to the mouth of the spindle. A standard Magnus chuck with a capacity from 0.004 to 0.315 inch or a No. 1A Jacobs drill chuck with a capacity of $\frac{1}{4}$ inch can be used to hold tools.

February, 1955

How to Make Gages With Millionths Accuracy in Minutes

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Gaging System

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types made
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ASSEMBLE—place gage
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snap pins through end
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TIGHTEN CLAMPS—
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A high-precision lathe
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A master-designed machine that professionals and small-parts mfrs., amateurs, demand—AT A PRICE HERETOFORE UNATTAINABLE. Thoroughly seasoned, one-piece cast iron construction, complete interchangeable headstock, tailstock, and bed... extremely close tolerances possible, with indicator readings to plus or minus .0001... 5/16 collet capacity, 2 point suspension, 4" swing and many other features. Complete with all standard equipment, on a noise and vibration-proof mounting.

Accessories and Hardwood Base available.



113 Edison Place, Newark 5, N. J.

Caliper Utilizes Dial Indicator

Designated as the "Dial Cal," a caliper which utilizes a dial indicator to provide ease in reading has been announced by Inspection Devices Co., 5636 S. Lake Park Ave., Chicago 37, Ill. According to the manufacturer, the dial indicator provides for direct reading in thousandths of an inch. The caliper is made of stainless steel and has a full 6-inch capacity. The instrument can also be used as a depth gage.



"Dial Cal" Caliper

The unit can be accurately read by inexperienced personnel.

★ ★ ★

Vertical Milling Machine

Simmons Industries, 53 Shotwell St., San Francisco, Calif., has announced the Van Vertical Milling Machine which is said to meet high precision standards. The machine features a gibbed overarm with handwheel control which is claimed to assure easy, positive and accurate in-and-out movement of the overarm for maximum cross milling capacity and accurate movement for change in setups. According to the manufacturer, the three-point base has felt-mounted pads to permit immediate production. Maxi-

WORLD'S HARDEST METAL

IMPROVED QUALITY

Additional refinements and improvements in our process have added still longer life to the wearing edges of Talide tools, dies and wear resistant parts. The result is a carbide having a new, unique grain structure with harder and tougher properties than previous grades. Laboratory tests reveal our improved grades possess 25% greater strength and rigidity. Service life per grind up to 50% longer than previous grades has been proven in grueling field tests.

METAL CARBIDES CORP., YOUNGSTOWN 7, OHIO

Write for Catalog 55-G

METAL CARBIDES CORPORATION
TALIDE®
YOUNGSTOWN 7, OHIO

HOT PRESSED AND SINTERED CARBIDES . VACUUM METALS
HEAVY METAL . CERMETS . HIGH TEMPERATURE ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

mum rigidity is achieved with rugged, heavy-ribbed column, knee and table construction, with wide ways.

The milling machine has eight spindle speeds ranging from 90 to 2,500 r.p.m. with a $\frac{3}{4}$ -h.p. motor and from 135 to 3,750 r.p.m. with a 1-h.p. motor. The spindle is driven by a timing belt designed to eliminate belt slippage. The machine utilizes a $3\frac{1}{2}$ -inch hard chromed quill which has a 4-inch travel, and maximum collet capacity is



Van Vertical Milling Machine

$\frac{3}{4}$ inch. Individual toolholders are available up to a 1-inch capacity. Optional equipment for the Van Vertical Milling Machine includes mechanical power feed to the table from 0 to 20 inches per minute, infinitely variable with instant reverse; a wide-opening toolmaker's vise; side milling cutting arbor; and extra length table. Hydraulic power feeds and special tooling for individual needs can be obtained, as well as a choice of hand, semi-automatic or automatic controls.

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Quality Unit
of its Kind

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that stocks gages, cutting
tools, supplies, etc. Write*

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Anyone can
operate it

Can be used
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RECLINABLE POWER PRESSES



Ideal for general stamping work . . . 4 to 100 tons capacity. Can recline to 40° with perfect safety.

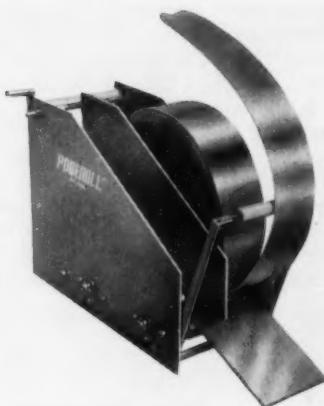
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ZEH & HAHNEMANN CO.
190 VANDERPOOL ST. NEWARK 5, N. J.

Improved Automatic Coil Cradle Has Ramp for Ease in Loading

Wm. Halpern & Co., Inc., 100 Stevens Ave., Mount Vernon, N. Y., has announced the Medelton Improved "Powerroll" Automatic Coil Cradle which utilizes a ramp for rolling the coil into the cradle and eliminating lifting. Three actuating screws acting against a separator plate allow coils to be positioned in the cradle. An additional power-driven roller has been incorporated to allow the coil to be driven even when reduced to a small diameter. All three rollers are now case hardened and sand blasted for long wear and maximum traction. Heavy-duty micro-switches are now furnished with a strong positive stop to prevent damage through carelessness and abuse. The size of the plates have been increased and extended below the drive rollers to provide better guiding and to prevent material from

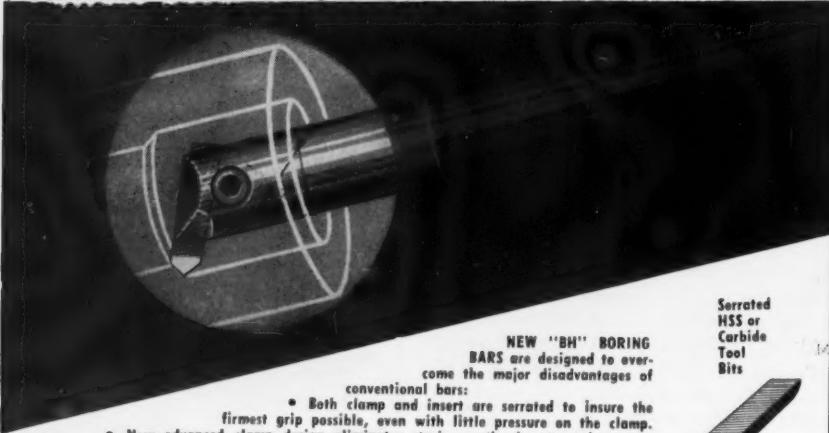


Medelton Improved "Powerroll" Automatic Coil Cradle

telescoping under the separate plate.

The coil cradle is available in two models; namely, the Model R104 and the Model R204. The Model R104 has

NEWEST DEVELOPMENT IN PRECISION BORING BARS



NEW "BH" BORING
BARS are designed to over-
come the major disadvantages of

conventional bars:

- Both clamp and insert are serrated to insure the firmest grip possible, even with little pressure on the clamp.
- New advanced clamp design eliminates strain on the inserts and prevents breakage of tool bits.
- Carbide and HSS inserts have a half-elliptical shape for better side clearance and more strength, less chatter.

Write for free catalog to:

R. B. TOOL CO., INC.

784 North Broadway
White Plains, N. Y.



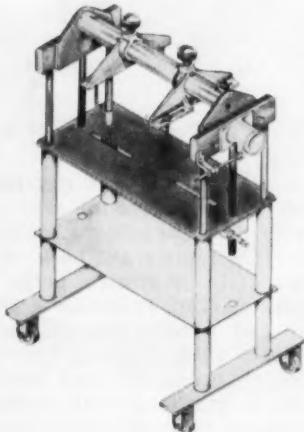
IN CANADA:
CANADIAN M.S.E.
171 Kipling Ave. S.
Toronto 18, Ontario

a capacity for handling rolls up to 800 lb., and the R204 can handle rolls weighing up to 2,000 pounds.

★ ★ ★

Unit Is Designed to Handle Large Dies

Identified as the Model 1016, a die handler which is said to be capable of handling dies measuring as large as 18 x 24 inches has been announced by Hansford Mfg. Corp., 1239 University Ave., Rochester 7, N. Y. The handler,

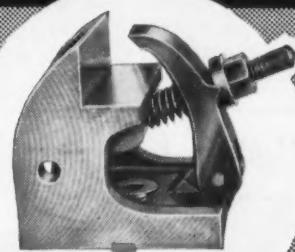


Hansford Model 1016 Die Handler

it is claimed, will hold the top die section by means of clamps to allow the toolmaker to reach any screws on the top which hold punches or segments. The die is separated by means of an elevating crank which operates a lead screw on both ends of the die handler. After separation, the top section of the die may be revolved by means of a worm and worm gear. A hand crank permits revolving 360 degrees.

According to the manufacturer, positive locking in the 0-degree position is assured by means of pins, thus permitting light tryout of the die. The unit is portable.

SAVE the expense
of special jigs, fixtures —
Save set-up time, too!



HART MILLING FIXTURES

"Masters of A Thousand Set-ups"

The inexpensive, versatile answer to many different set-up problems. Hart Fixtures hold round, hexagonal, octagonal or square stock aligned with the machine, on miller, shaper, drill press and tapper. Value proved for years in large and small shops; famous for key-way set-ups. Usually sold in pairs; four sizes, capacity $\frac{1}{2}$ " to $4\frac{1}{2}$ ", can be used horizontally or vertically.

WRITE FOR
ILLUSTRATED
FOLDER



WALTER W. FIELD & SON, INC.
39 Hayward St., Cambridge 42, Mass.

Unit Brazes Band Saw Blades up to 1½ Inches Wide

Designated as the No. 562, an electric brazer designed for handling band saw blades up to 1½ inches wide has been announced by Oliver Machinery Co., Grand Rapids 2, Mich. The unit utilizes the electric heat of resistance for melting down the soldering metal, thus eliminating open flame, danger of fire and formation of scale.

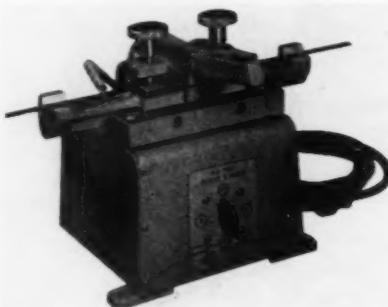
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* Pioneers in the riveting field. Head rivets from smallest to ¾" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.
96 Silliman Ave. Bridgeport 5, Conn.

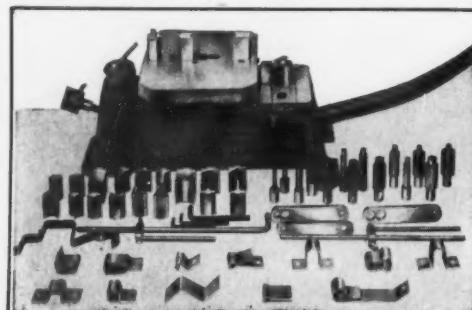
The top part or bed of the brazer consists of an accurately machined and permanently located back



Oliver No. 562 Electric Band Saw Brazer

rail, clamping plates and clamps accurately fitted to hold the saw ends. Two spring devices hold the back edge of the blade against the back rail to ensure a perfectly straight braze. The electrical element comprises a transformer and a secondary coil which serves as a guide for both saw ends. The switch has three head positions and can be regulated both backward and forward, thus permitting the regulation of the heat condition during the melting period. The brazer is equipped for automatic tempering.

The No. 562 is regularly furnished for single-phase, 50 or 60-cycle, 110,



Multiform BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bands, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies ,Etc.

AIR OR HAND MODELS FOR UP TO 1/4" to 4" MATERIAL

Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.
Dept. 6-M Kalamazoo, Mich.

220 or 440-volt alternating current as specified. For two or three phase power lines, 50 or 60 cycle, special wiring from switch to power line is essential. The brazer is said to be always ready for work and requires only insignificant consumption of current because the process takes only a few seconds. If too much current is turned on, the saw will melt at the point of brazing and break the electric circuit, so no

damage can be done. The unit is well insulated and the voltage at the point of action is low so that no shock can be given to the operator.

★ ★ *

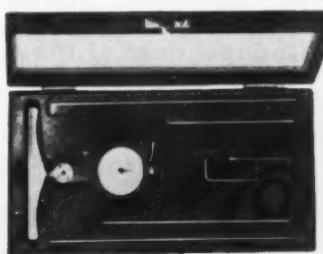
Tooling Utilizes "Throw-Away" Carbide Inserts

Kennametal Inc., Latrobe, Pa., has announced the addition to its Kindex line of a type of tungsten carbide tool-



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Reliant Industries

NATIONAL DISTRIBUTORS:
RELIANT GAGE & SUPPLY CO.
4969 FIRESTONE BOULEVARD
SOUTH GATE, CALIFORNIA



ALSO MANUFACTURERS OF PRECISION GAGES FOR CHECKING GROOVE DIMENSIONS FOR "O" RINGS AND SNAP RINGS

ing which utilizes "throw-away" carbide inserts that may be turned over and used on each side prior to disposal, eliminating all grinding in the user's shop. The insert, it is claimed, can be indexed in seconds. The tooling is provided in two types; namely button tools and heavy-duty tools. On the button tools, a removable chip breaker is used, while on the heavy-duty line a hardened clamp serves as a chip deflector.

Portable Sandblast Gun



—Complete—
simply connect
to air line

- Rugged
- Efficient
- Guaranteed

A Real Performer
Handy in any shop

\$27.50

Box 885 M
LINDBERG PRODUCTS CO., Los Gatos, Calif.



Powered by the press ram... independent of the die

1. CHOPS steel up to 3" wide, $\frac{1}{4}$ " thick.
2. FITS any punch press . . . easy to install.
3. CUTS DOWNTIME . . . high speed steel blades installed in a moment.
4. SAVES HANDLING SCRAP . . . scrap falls into collection barrel.
5. SAVES MONEY . . . low purchase price, no operating cost.

Write today for full details

JACO

DEVICES, INC.

98 HIGH STREET • HINGHAM, MASS.

The button tools, with square or triangular tungsten carbide buttons, are available in two finishes; namely,



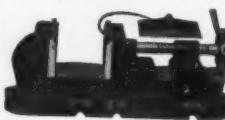
Kennametal Kendex Button Tool

"regular" which are molded to size with the nose radii and top and bottom surfaces ground and "precision" which are ground all over for accurate on-the-job indexing. The heavy-duty tools are furnished with rectangular carbide inserts having a 15-degree lead angle and parallelogram-shaped carbide inserts for cutting to a shoulder. Only "regular" inserts are furnished in the heavy-duty type tool. Inserts are ground to index within plus or minus 0.005 inch. According to the manufacturer, top clamps provide quick indexing. Inserts are held (on both types of tools) in the shank at 5-degree negative rake angles and can be turned over to use cutting edges on both sides. After all the cutting edges are used, the inserts can be thrown away.

"This Seems Worth Looking Into"

GEM VISES

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Machines. Plain,
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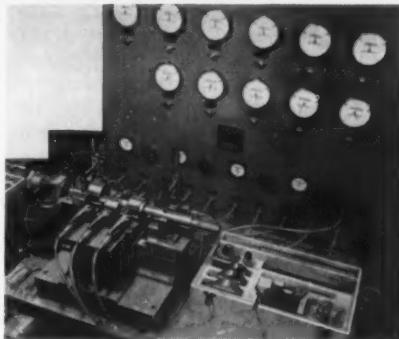
J. E. MARTIN MACHINE CO.

PRR AND STATE

SPRINGFIELD, OHIO

Multi-Station Air Gage Checks Refrigerator Compressor Crankshafts

Designated as the Model AIR H-160, a multi-station Dimensionair gage, which checks 11 separate dimensions on refrigerator compressor crankshafts for commercial air conditioning units, has been developed by Federal Products Corp., 5141 Eddy St., Providence 1, R. I. The gage is equipped with six fixed, jetted air snaps which measure the diameters of the bearing journals and cams. After these diameters have been checked, a positioning device moves the crankshafts to the right where an axis is established by the gaging vee, so the throws can be measured. These dimensions are checked with a Federal AirProbe, a universal gaging spindle. While the crankshaft is in the second position, another AirProbe which is mounted on a free-floating motion transfer unit



Federal Model AIR H-160 Multi-Station Dimensionair Gage

checks the squareness of the thrust face with the bearing journals. The final measurement, the end diameter of the shaft, is taken with a regular Federal portable air snap gage.

In order to facilitate handling the crankshafts, two sets of vees are provided. One is a loading vee, used to

100%
guaranteed!

**80% faster finish
sizing with**



ONLY DEKA-BORE

- Can be adjusted in fractions of 1/10,000" on the full diameter as easily as reading 1/16" on a steel rule. Not a vernier or scroll adjustment.
- Can be calibrated in increments of .00005 on radii or .0001 on diameter as easily as picking up .002 on a conventional micrometer dial.

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MM-2

position the part for measuring. After placing the crankshaft correctly in the loading vee, the operator pulls a hand lever dropping the loading vee down while pushing the gaging vee, and the fixed air snaps into gaging position. This same lever is also used to depress three of the air snaps when changing gage positions. Gages of this type can be made for crankshafts of all sizes, as well as camshafts or other similar parts. The Dimensionair air

gage is said to provide stable, dependable accuracy with magnifications of 2,500 or 5,000 to one.

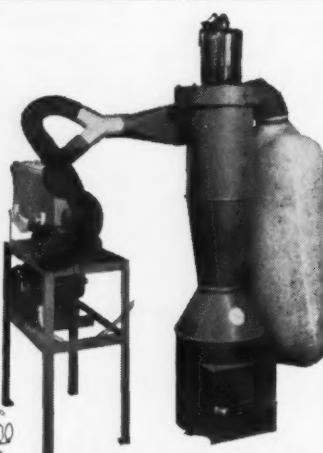
★ ★ ★

End Mill Is Automatically Machined to Low Micro-Finish

Wadell Tools, P.O. Box 97, Raritan, N. J., has announced the "New Design" End Mill which is said to be automatically machined to a low micro-finish. According to the manufacturer,

the end mill is made by an automatic machining process which produces tools to unusually accurate physical dimensions, permitting uniform flutes in each end mill and consistent uniformity in all end mills. The automatic machining cuts each flute in only one direction with a low micro-inch finish which provides a mirror-like finish. The end mill is said to cut freely.

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A size and model to solve any dust collecting problem. Torit

collectors provide complete, all-around dust control. Torit collectors are unitized for custom installation on each machine, giving power and suction only when machine is operating. Keeps plant and machines free from clogging and unsightly dust. Furthermore, cleaned and filtered air is exhausted back into the room maintaining heat balance. Find out now how Torit unitized dust control is engineered to your problems.

See our catalog in Sweet's Machine Tool File, or write:

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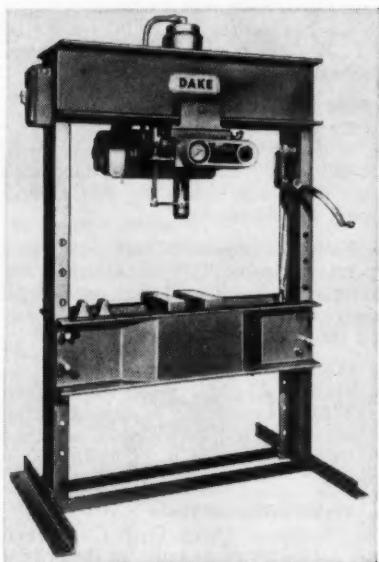
296 Walnut St., St. Paul 2, Minn.



Wadell "New Design" End Mill

Electric-Hydraulic Shop Press Features Rapid Ram Approach

Designated as the "Elec-draulic," an electric-hydraulic shop press which features rapid ram approach that is said to entirely eliminate the use of a handwheel has been announced by Dake Engine Co., 612 Seventh St., Grand Haven, Mich. When the control knob is turned, the ram advances at high speed until it comes in contact



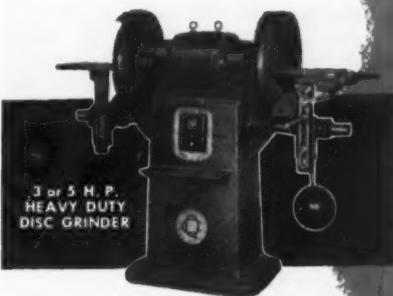
Dake "Elec-draulic" Press

with the work, and then it automatically changes to the power stroke. According to the manufacturer, the speed of the ram is completely variable from zero to maximum under fingertip control by the operator. The knob automatically turns to "off" when the hand is removed. All controls and gages are located at convenient working height in a streamlined control panel.

The workhead is completely self-
(Continued on page 310.)

"Time Savers in any shop"

QUEEN CITY heavy duty DISC GRINDERS and BUFFERS



Queen City Heavy Duty Grinders and Buffers are designed for the hardest use. Extra heavy spindle, large, high quality ball bearings and special duty motors all contribute to long, trouble-free service.

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"Queen City Grinders—Famous For Over 50 Years"

new
literature

1. Marking Equipment

Folder illustrating equipment required for marking motor and machinery name plates. The Acromark Co., 9 Morrell St., Elizabeth 4, New Jersey.

2. Alloy Tool Bits

Allegheny Ludlum Steel Corp., Dept. MS, Pittsburgh 22, Pa. 4-page catalog describing ALX Alloy Tool Bits, the fast-cutting non-ferrous alloy containing boron.

3. Stainless Steel Piping

Illustrated 6-page bulletin (No. TB-356) discussing seamless or welded stainless steel piping. The Babcock & Wilcox Co., Beaver Falls, Pa.

4. Machine Mounts

The Barry Corp., 1000 Pleasant St., Watertown, Mass. 4-page catalog covering the line of Barrymounts for control of shock and vibration.

5. Air Valve

"Electroaire" Valve described in 8-page bulletin (No. AV 300R). The Bel-lows Co., Dept. MMS, Akron 9, Ohio.

6. Screw Machine Tools

Boyar-Schultz Corp., 2020 S. 25th Ave., Dept. C-N, Broadview, Ill. 26-page bulletin on screw machine tools.

7. Standard Tools and Blanks

Standard tools and blanks are discussed in 16-page publication (No. GT-305). Carboloy Department of General Electric Co., 11143 E. 8 Mile St., Detroit 32, Michigan.

8. Abrasive Grain and Powders

The Carborundum Co., Niagara Falls, N. Y. 42-page booklet (No. 14) covering abrasive grain and powders.

9. Band Saw Tires

Illustrated catalog sheet describing "Jiffy" Band Saw Tires. Carter Products Co., Inc., 426 Wm. Alden Smith Bldg., 30 Ionia Ave., S. W., Grand Rapids 2, Michigan.

10. Decimal Equivalent Chart

Chicago-Latrobe, 419 W. Ontario St., Chicago 10, Ill. 18 x 24-inch wall chart showing decimal equivalents and tap drill sizes.

11. Milling Machines

Illustrated 28-page publication (No. M-1871) describing "HyPowermatic" Milling Machines. The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

12. Carbide-Tipped Tools

The Cleveland Twist Drill Co., Cleveland, Ohio. 24-page bulletin describing its line of carbide-tipped cutting tools.

13. Dual-Ram Broaching Machines

Illustrated 4-page bulletin (No. RT-54) on Model RT Dual-Ram Broaching Machines. Colonial Broach Co., Detroit 13, Michigan.

14. Stainless Steel

Crucible Steel Company of America, Dept. MS, Oliver Bldg., Pittsburgh 22, Pa. 24-page booklet describing use of stainless steel in the building field.

USE CARD FOR FREE LITERATURE

15. Magnetic Base Indicator Holders

Cullen Mfg. Co., Racine, Wis. 8-page catalog (No. 755) describing Erick Magna-Holders and accessories. Illustrated.

16. Cylindrical Grinding Attachment

Illustrated 4-page bulletin discussing Model "C" Cylindex, a cylindrical grinding attachment for surface grinders. Cylindex, Inc., 44 Charlotte St., Binghamton, New York.

17. Molded Plastics

Dayton Rogers Mfg. Co., Minneapolis 7, Minn., 8-page bulletin on molded plastics in small lots.

18. Grinding Wheel Dressers

Illustrated 24-page catalog (No. 75) covering a complete line of grinding wheel dressers. The Desmond-Stephan Mfg. Co., Urbana, Ohio.

19. Hopper Racks

The Chas. Wm. Doepe Mfg. Co., Inc., 8879 Blue Ash Rd., Rossmoyne, Ohio. Illustrated bulletin (No. HR-101) describing NesTier Hopper Racks.

20. Folder Brakes

Illustrated 4-page folder discussing "Chicago" Single-Wing and Double-Wing Folder Brakes. Dreis & Krump Mfg. Co., 7418 S. Loomis Blvd., Chicago 36, Illinois.

21. Automatic Drill Unit

Dumore Precision Tools, 1300 Seventeenth St., Racine, Wis. 16-page operation and instruction manual on Series 24 Automatic Drill Unit.

22. Quality Stampings

Federal Tool & Mfg. Co., 3640 Alabama Ave., Minneapolis 16, Minn. 4-page bulletin (No. 201) on quality stampings in small quantities.

23. Cemented Carbides

Illustrated 20-page catalog (No. 1) discussing "Firlomet" cemented carbides. Firth-Loach Metals, Inc., Buttermilk Hollow Rd., McKeesport, Pa.

24. Clutches

Formsprag Co., 23601 Hoover Rd., Van Dyke, Mich. 20-page catalog (No. 102) covering clutches and clutch-coupling units.

25. Aluminum Designation System

Chart describing new Aluminum Designation System developed by The Aluminum Association. Peter A. Frasse and Co., Inc., 17 Grand St., New York 13, New York.

26. Turret-Type Milling Machine

Graham Machine Tool Co., 19 Cleveland Place, New York 12, N. Y. 4-page catalog on Pearson Model H Turret-Type Milling Machine.

MODERN MACHINE SHOP**FEBRUARY, 1955**

(THIS CARD MUST BE USED BEFORE APRIL 1, 1955)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60

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27. Carbide Tool Grinders

Illustrated 12-page catalog (No. 225) describing chip breaker grinders, diamond finishing grinders and carbide tool grinders. Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Michigan.

28. Knife Grinders

Hanchett Mfg. Co., Big Rapids, Mich. Complete catalog on knife, shear blade and circular slitter-type knife grinders.

29. Universal Iron Bender

Two-color bulletin on wrenchless-type universal iron bender with hydraulic attachment. Hossfeld Mfg. Co., 402 W. 3rd St., Winona, Minnesota.

30. 150-Ton Press

The Hydraulic Press Mfg. Co., Mount Gilead, Ohio. 6-page bulletin (No. 5408) on the CU-3 150-Ton Press.

31. Electric Impact Tool

Illustrated 4-page folder discussing Size 5U 1/2-Inch Drive Electric "Impactool." Ingersoll-Rand, 11 Broadway, New York 4, New York.

32. Automatic Bar Feed Attachment

Kalamazoo Tank and Silo Co., Machine Tool Division, 1110 Harrison St., Kalamazoo, Mich. Bulletin (No. K-1253) covering "Kalmatic" Automatic Bar Feed Attachment.

33. Milling Machines

Knee-type ram-head plain and universal milling machines described in catalog (No. RH-10). Kearney & Trecker Corp., Milwaukee 14, Wisconsin.

34. High-Speed Friction Saws

Kling Bros. Engineering Works, 1320 N. Kostner Ave., Chicago 51, Ill. Bulletins covering Kling high-speed friction sawing machines.

35. Electric Motor Service Stations

Brochure listing Authorized Lima Service Stations, representatives and factory distributors. The Lima Electric Motor Co., 126 Findlay Rd., Lima, Ohio.

36. Hardfacing

Reprint entitled "The Effect of Welding Variables on Hardfacing Deposits." The Lincoln Electric Co., Cleveland 17, Ohio.

37. Milling, Grinding, Drilling Machines

Masters, Box 8, Newtown, Ohio. 12-page catalog on Arboga line of milling, grinding and drilling machines.

38. Gear Sets

Selection and ordering date and specifications for Cone-Drive gear sets are contained in bulletin (No. 700). Cone-Drive Gears Division, Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Michigan.

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39. Straight Side Presses

Niagara Machine & Tool Works, Buffalo 11, N. Y. 28-page bulletin (No. 66) describing straight edge, single action, eccentric geared presses.

40. Knives, Blades and Tools

Spiral-bound catalog (No. 22) covering entire OK line. Ohio Knife Co., Dept. HH-35, Cincinnati 23, Ohio.

41. Optical Comparator

Portman Instrument Co., Inc., New Rochelle, N. Y. 4-page catalog discussing the "Target" Duplex Shadowgraph Comparator.

42. Engraving Machine

Catalog covering the Model 3D-5 Precision Engraving Machine. H. P. Preis Engraving Machine Co., 657 U. S. Route 22, Hillside, New Jersey.

43. Electric Trucks

The Raymond Corp., 88-129 Madison St., Greene, N. Y. Electric trucks are described in catalog (No. 845).

44. Center Hole Chart

Engineers' master chart for center hole design which conforms to new drill standards. Ready Tool Co., 540 Iranistan Ave., Bridgeport 5, Conn.

45. Air Cylinders

Rivett Lathe & Grinder, Inc., Dept. MMR, Brighton 35, Boston, Mass. 12-page catalog (No. 55) on double-acting non-rotating air cylinders.

46. Hydraulic Shop Presses

Illustrated 16-page bulletin on hydraulic shop presses. Rodgers Hydraulic Inc., 7447 Walker St., Minneapolis 16, Minnesota.

47. Compression Fixture

Scully-Jones and Co., 1909 S. Rockwell St., Chicago 8, Ill. 4-page bulletin describing compression fixture and setting gage for recessing tools.

48. Machine Tools

Illustrated 24-page catalog describes 18 different machine tools. Sheldon Machine Co., Inc., 4250 N. Knox Ave., Chicago 41, Illinois.

49. Precision Lathes

South Bend Lathe Works, South Bend 22, Ind. 4-page bulletin (No. 5403) on 14½-inch precision lathes.

50. Storage Racks

Illustrated 4-page catalog describing "Ad-A-Rack" storage racks. Sterling Factory Equipment Co., 183 Charles St., Providence, Rhode Island.

51. Way Lubricant

Technical bulletin (No. 28) covering special lubricant for the ways of machine tools. Sun Oil Co., Dept. MM, Philadelphia 3, Pennsylvania.

52. Engineered Production Service

Sundstrand Machine Tool Co., 2539 Eleventh St., Rockford, Ill. 32-page booklet on engineered production service.

53. Stock Parts for Dies

Half a million stock parts for dies are listed in 28-page catalog. Toolcraft Industries Corp., 305 E. 140th St., New York 54, New York.

54. Dust Collector

Torit Mfg. Co., 296 Walnut St., St. Paul 2, Minn. 4-page bulletin describing "Cyclo Filter" Dust Collector designed for heavy-duty operations.

55. Profile Grinder

Illustrated 4-page bulletin (No. TPG-5) covering the No. 5 Tangent-Arc Profile Grinder. Union Twist Drill Co., Athol, Massachusetts.

56. Air-Powered Bench Vises

Van Products Co., 3736 W. 12th St., Erie, Pa. 4-page catalog discussing "Vi-Speed" Air-Powered Bench Vises.

57. High Speed Blanks

Illustrated 8-page circular (No. 915-N-2) on high speed blanking presses. The Waterbury Farrel Foundry & Machine Co., Waterbury, Connecticut.

58. Metal Band Saws

W. F. Wells & Sons, Three Rivers, Mich. 4-page brochure describing the J24 Metal Band Saw.

59. End Mills

Illustrated folder discussing "Shear-Carb" shell mills and end mills. Wendt-Sonis Co., Hannibal, Missouri.

60. Small Precision Cutting Tools

Woodruff & Stokes Co., Inc., 343 Lincoln St., Hingham, Mass. Catalog sheet on 50 small precision cutting tools.

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Economy
TOOL & MACHINE CO.

1827 S. 68th St., Milwaukee 14, Wis.

New Shop Equipment

(Continued from page 307.)

contained and is readily movable (on needle bearings) to center over the work. The ram has a full 10-inch stroke. The workhead can be supplied as a separate unit.

★ ★ ★

Standard Tools and Blanks for Steel Cutting Operations

One-hundred seventeen additional sizes of standard tools and blanks for steel cutting operations in the Series 300, Grades 350 and 370 carbide tools, have been added to its line of tools for industry use by Carboloy Department of General Electric Co., 11143 E. 8 Mile St., Detroit 32, Mich. Other metalworking carbides added include 20 sizes of Grade 883 and 44A carbide Style 0000 blanks for heavy-duty cast iron and non-ferrous cutting operations; throw-away type blanks in grades for steel and non-ferrous cutting applications; standard Grade 883 and 350 carbide Style F and G offset turning tools in $\frac{1}{2}$ and $\frac{5}{8}$ -inch sizes designed for both ferrous and non-ferrous cutting; and offset threading tools.

★ ★ ★

Machine Taps 97 Holes Automatically

For farm equipment manufacturers, Michigan Drill Head Co., P.O. Box 4643, Detroit 34, Mich., has developed a machine which, in one cycle, automatically taps a total of 97 holes in all six sides of a transmission case. According to the manufacturer, the machine can complete the tapping operations on 40 crank cases per hour, hour after hour without any down time.

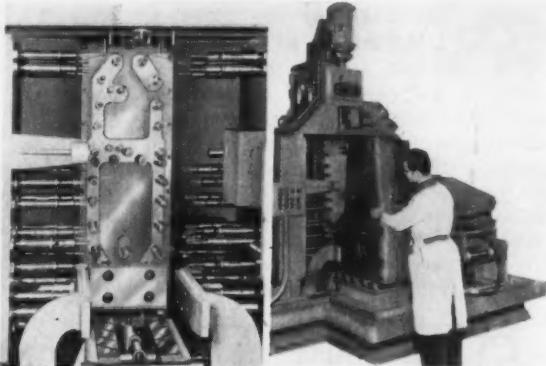
From a roller conveyor, the crank-case enters the machine, the cycle switch is operated and the automatic cycle begins. Locators align the

Michigan Special Automatic Tapping Machine for transmission cases

crankcase, the crankcase is clamped, the front tapping unit slides in front of the case, and then all tap spindles start rotating.

There are six tapping units, one for each side of the crankcase. The front unit has four spindles; the bottom unit has 10 spindles; the right-hand unit has 21 spindles; the left-hand unit has 22 spindles; the top unit has eight spindles; and the rear unit has 32 spindles.

All spindles are of the individual lead screw and nut type, individually



lubricated. All taps are lubricated by an independent coolant system. When tapping is completed, the crankcase is automatically unclamped, the locators retract and the front tapping unit returns to its original position, thereby clearing the way for the unloading operations.

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Mfd. by METTLER MACHINE TOOL, INC., 157 Adeline Street, New Haven, Conn.

Lathe Features Self-Contained Motor Drive

Available with either a 9 or 10-inch swing, a self-contained motor-drive floor lathe designed to combine the advantages of floor mounting with the economy of bench lathe construction has been announced by South Bend Lathe Works, South Bend 22, Ind. The 12-speed self-contained motor drive unit is permanently mounted on the back of the lathe headstock and



South Bend Self-Contained Motor Drive Lathe



**NEW NESTING TYPE
TOTE PANS**

Sturdy 16 ga. metal.
20" long x 12" wide
x 6½" deep. Drag
holes and handles at
both ends.

J. L. LUCAS & SON, INC.
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provides approximate spindle speeds of from 48 to 1,435 r.p.m. for the 10-inch model and from 50 to 1,270 r.p.m. for the 9-inch model. Direct belt drive to the spindle is said to assure smooth operation at high speeds. Slow spindle speeds are driven through back gears. A quick-acting belt tension release permits releasing the tension of the cone pulley belt to change speeds.

Heavy cast iron legs provide rigid support for the lathe bed. The chip pan is of welded steel construction

**KENNAMETAL
CUTTING TOOLS**

for Increased
Productivity

KENNAMETAL Inc.
LATROBE, PA.

CEMENTED CARBIDE TOOLS,
BLANKS, MILLING CUTTERS



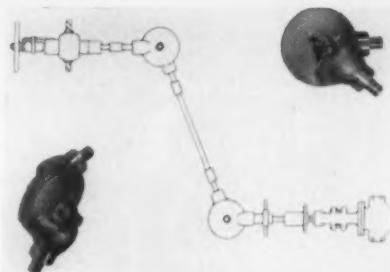
with a roll rim all around the edge. Four bed lengths are available, providing distances between centers ranging from 16 to 34 inches. The 9-inch lathe can accommodate work up to 9 $\frac{1}{4}$ inches in diameter over the bed and 5 $\frac{1}{2}$ inches in diameter over the saddle cross slide. Maximum swing for the 10-inch lathe is 10 inches over the bed and 6 $\frac{1}{4}$ inches over the cross slide. Both the 9 and 10-inch swing models are available in quick-change gear and standard change gear types. Quick change equipment provides 48 screw threads ranging from 4 to 224 per inch, 48 longitudinal feeds from 0.0015 to 0.0255 inch and 48 power cross feeds from 0.0004 to 0.0255 inch. Standard change equipment provides 45 threads from 4 to 160 per inch.

★ ★ ★

Geared Joint Transmits Torque Around A Bend

Stow Mfg. Co., 1 Shear St., Binghamton, N. Y., has announced a mechanical device for transmitting torque around a bend, called a "geared joint." Said to be rugged and reliable, the joint transmits power by a system of bevel gearing. Unlike a universal joint, the geared joint has no maximum angle of operation and will operate in any angle up to 360 degrees. According to the manufacturer, the primary use for the geared joint is for making sharp bends with flexible shaft or reach rod remote controls for valves, such as shown in the accompanying illustration. When installing valve controls, it is often necessary to make sharp bends in the controls to avoid obstacles. The geared joint, it is claimed, makes it simple to detour around these obstacles since the workman can set the joint for any angle necessary.

The geared joint is available in three sizes for accommodating maximum operating torques of 500, 2,000 and



Stow Geared Joints

3,500 lb./inches, flexible shaft diameter sizes ranging from $\frac{1}{2}$ to 1 $\frac{1}{8}$ inches and rigid rod diameter sizes from $\frac{1}{2}$ to 1 $\frac{1}{2}$ inches.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

For further information on any product mentioned in this issue—use the
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metalworking news in brief

To complete the integration of engineering activities, The Cleveland Crane & Engineering Co., Wickliffe, Ohio, has announced that **Harry Cotesworth** has been advanced to chief engineer of the development department and **Kurt R. Weise** will hold the position of chief engineer of the Cleveland Tramrail Division.

★ ★ ★

Harry E. Howard, personnel manager of Norton Co., Worcester, Mass., died recently at 61 years of age. Mr. Howard was associated with Norton for 40 years.

★ ★ ★

The E. Horton & Son Co., Windsor Locks, Conn., has announced the appointment of **E. J. Somerville**, Chicago, Ill., as manufacturers' representative for Horton Chuck in Illinois.

★ ★ ★

J. H. Williams & Co., Buffalo, N. Y., has announced the appointment of **Edward R. Burkhardt** as sales manager. Mr. Burkhardt formerly acted as the firm's sales representative in the Los Angeles area. **John B. Perkins** will slowly taper off his activities as vice president, tool sales, until December 31, 1955, at which time he will transfer to the west coast to take charge of the company's Los Angeles office until his retirement. Williams has also announced the appointment of **Gerald W. Caruso** as assistant sales manager. Mr. Caruso has been associated with Williams' Buffalo sales office for a number of years.

Wilton Tool Mfg. Co., Inc., Chicago, Ill., has announced the promotion of **Alex J. Vogl** to the position of vice president for sales. Formerly sales manager, Mr. Vogl will be succeeded by **William J. Ferrick**.

★ ★ ★

The promotion of **E. Hugh Jones** to operations manager and **Richard A. Lodge** to assistant sales manager of its Lima and Fostoria plants has been announced by Ex-Cell-O Corp., Detroit, Michigan.

★ ★ ★

The appointment of **Felix Kremp** as assistant manager of the tool steel sales division has been announced by Crucible Steel Company of America, Pittsburgh, Pa. Mr. Kremp will be primarily responsible for the sales of the division's products produced at the company's Park Works in Pittsburgh.

★ ★ ★

Ready Tool Co., Bridgeport, Conn., has announced the following distributor appointments for the complete line of "Red-E" centers, grinder dogs and milling machine dogs: **Bearings, Inc.**, 1607 W. Hunting Park Ave., Philadelphia, Pa.; **The Geo. Worthington Co.**, 802-832 St. Clair Ave., N. W., Cleveland, Ohio; **Chandler & Farquhar**, 900 Commonwealth Ave., Boston, Mass.; **Louisville Mill Supply Co.**, 15th and Madison Sts., Louisville, Ky.; **Sonnet Supply Co.**, 576-80 N. Prairie Ave., Hawthorne, Calif.; and **Sager-Spuck Supply Co., Inc.**, 364 Broadway, Albany, New York.

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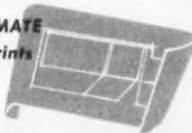
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Metalworking News in Brief

Bertrand J. Hansson has been appointed as a sales representative for The Billings & Spencer Co., Hartford, Conn. Mr. Hansson will maintain headquarters in the company's Chicago branch office at 100 South Jefferson Street.

★ ★ ★

The E. Horton & Son Co., Windsor Locks, Conn., has announced the appointment of Fred L. Bishop of Atlanta, Georgia, as manufacturers' representative for Horton Chuck in the states of Virginia, North Carolina, South Carolina, Georgia and Florida.

★ ★ ★

E. F. Houghton & Co., Philadelphia, Pa., has announced the appointment of Dr. Kurt C. Frisch as assistant manager of research. Formerly supervisor of organic research in the Houghton Laboratories, Dr. Frisch will be succeeded by Dr. Ellis Abrams.

★ ★ ★

Paul D. Sullivan has been named assistant sales manager by Le Roi Division of Westinghouse Air Brake Co., Milwaukee, Wis. Mr. Sullivan was formerly in charge of contractor sales for Le Roi in New York.

Stearns Magnetic, Inc., Milwaukee, Wis., has announced the appointment of David F. Christnelly as assistant sales manager. Mr. Christnelly will be responsible for assisting in the selling of the company's entire line of equipment and will act as liaison between the company and its field representatives.

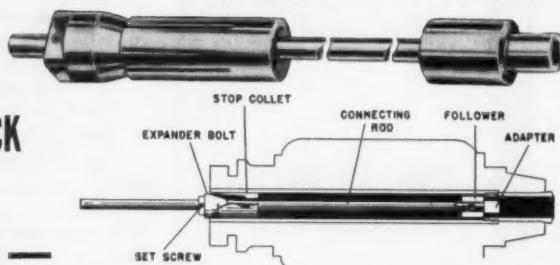
★ ★ ★

Merit Products, Incorporated, has announced the appointment of William G. Gillett as works manager of its Culver City plant in California. Mr. Gillett will supervise the production of "Sand-O-Flex" contour sanders and "Grind-O-Flex" flexible grinding wheels.

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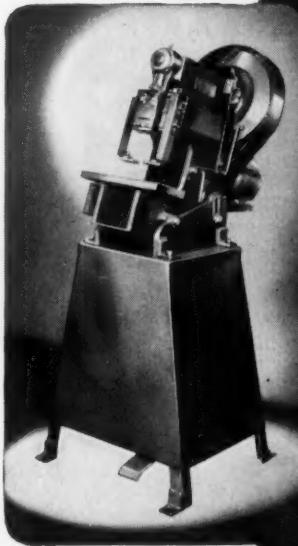


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Metalworking News in Brief

Willard G. Hartman, First National Bank Bldg., St. Paul, Minn., has been appointed representative for Continental Screw Co., New Bedford, Mass., for the states of Minnesota, North Dakota and South Dakota.

★ ★ ★

J. W. Mull, Jr., Indianapolis, Ind., manufacturers' representative for production tools, has announced the opening of a new branch office located at 34 N. Brentwood Blvd., St. Louis 5, Mo. **George Warren Duke** has been appointed to head the new office.

★ ★ ★

Glenn C. Wilhide, chief engineer of The Black & Decker Mfg. Co., Towson, Md., died recently at 58 years of age. Mr. Wilhide joined Black & Decker in 1925, serving as foreman of the toolroom and assistant factory superintendent prior to becoming head of the engineering department in 1937.



Joseph L. Ballash, chief engineer of Sterling Grinding Wheel Co., Tiffin, Ohio, recently retired after 32 years of service with the firm. Mr. Ballash will continue his association with the company in a consulting capacity.

★ ★ ★

The Columbia Division of The Lodge & Shipley Co., Hamilton, Ohio, has announced the promotion of **Arthur V. Baumann, Jr.**, to the position of advertising and sales promotion manager. Formerly assistant sales promotion manager of The Lodge & Shipley Co., Cincinnati, Mr. Baumann has been associated with the firm since 1952.

★ ★ ★

Carboloy Department of General Electric Co., Detroit, Mich., has announced the appointment of **Ernest E. George** as plant manager of its permanent magnet plant in Edmore, Michigan. Mr. George was formerly manager of magnetic products engineering.

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Metalworking News in Brief

Sidney O. Evans has been appointed to the newly created position of manager of tubing operations of The Babcock & Wilcox Company's Tubular Products Division plant in Beaver Falls, Pa. David A. Edgecomb has been named to succeed Mr. Evans as superintendent of the extrusion department.

★ ★ ★

W. D. Reogle, associated some years ago with the Detroit Die Set Corp., Detroit, Mich., has returned to that company as sales engineer for the Detroit eastern metropolitan area.

★ ★ ★

Crucible Steel Company of America, Pittsburgh, Pa., has announced the appointment of Albert C. Redding as technical and development engineer to the central operating staff of the company.

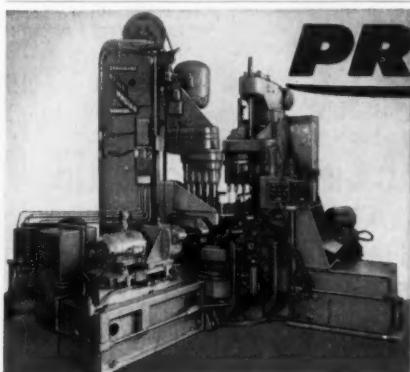
The Capewell Mfg. Co., Hartford, Conn., has announced the appointment of William C. Heard as domestic sales manager.

★ ★ ★

Nicholson File Co., Providence, R. I., has announced the appointment of Edmond A. Neal, Jr., as technical lecturer on the selection, use and care of hand steel files and rasps. Mr. Neal is available to speak before the personnel of metalworking and other industrial plants, apprentice groups in industry and classes in vocational and industrial schools.

★ ★ ★

Knud Engelsted, chairman of the board and president of O. S. Walker Co., Inc., Worcester, Mass., died recently. Born in Svendborg, Denmark, in 1889, Mr. Engelsted came to the United States in 1913 and has had many years of association in machine tool plants since that time.



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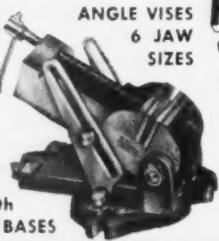
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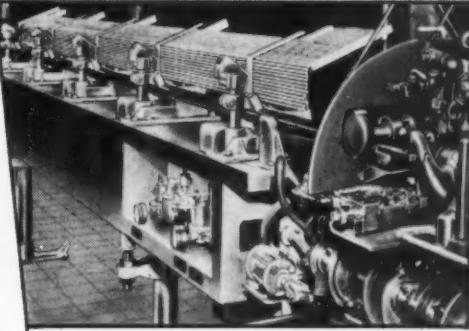
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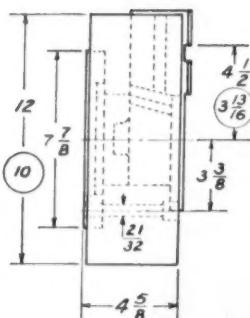
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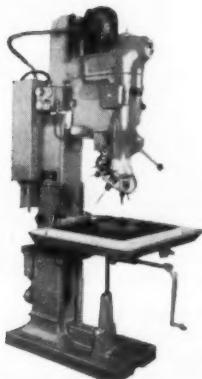
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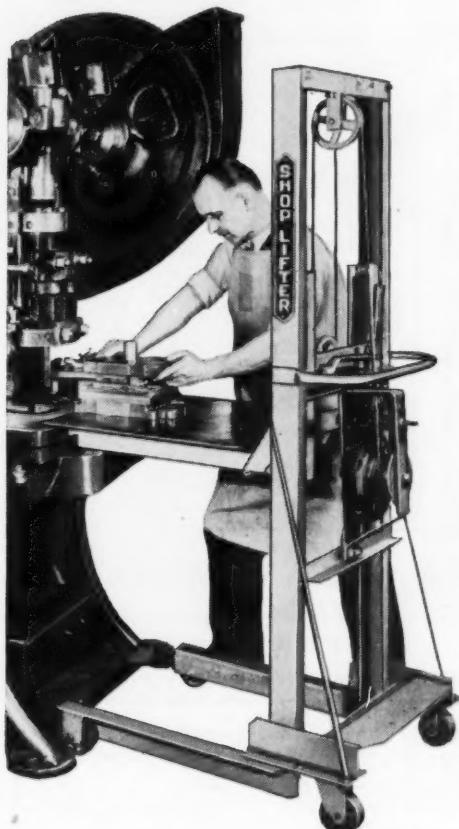
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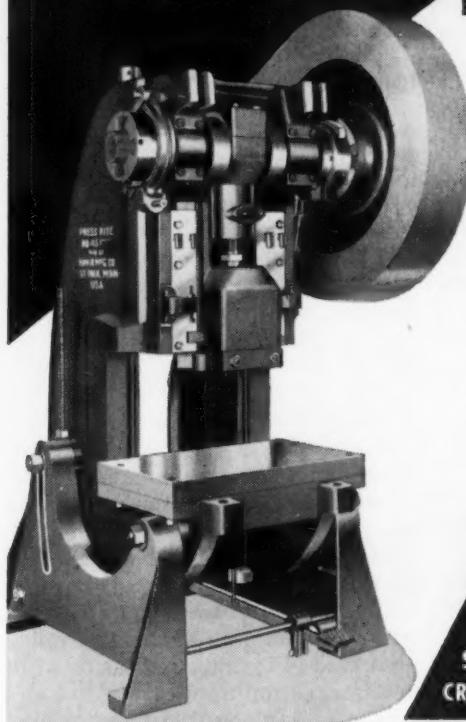
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We have just finished looking through the 56-page booklet "How to Use and Care for Milling Cutters" published by the Milling Cutter Division of the Metal Cutting Tool Institute, 405 Lexington Avenue, New York 17, New York. For the price, one dollar in check or money order, it would be hard to find a more detailed treatment of the subject. The booklet will be of particular value to supervisors, setup men, cutter sharpeners and milling machine operators. It presents in pictures and non-technical language the various factors that contribute to good milling practice. It also suggests means and methods of setting up, operating and maintaining milling cutters so as to obtain the best possible results. In addition, there has been included a brief section on safety because it is felt that precautions are particularly necessary in connection with milling operations.

We say it's a heap of information for just one dollar. Send to the Metal Cutting Tool Institute for your copy.

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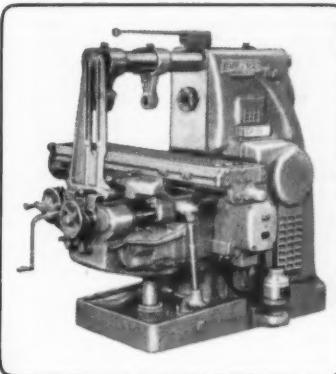
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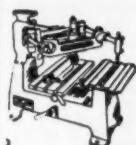
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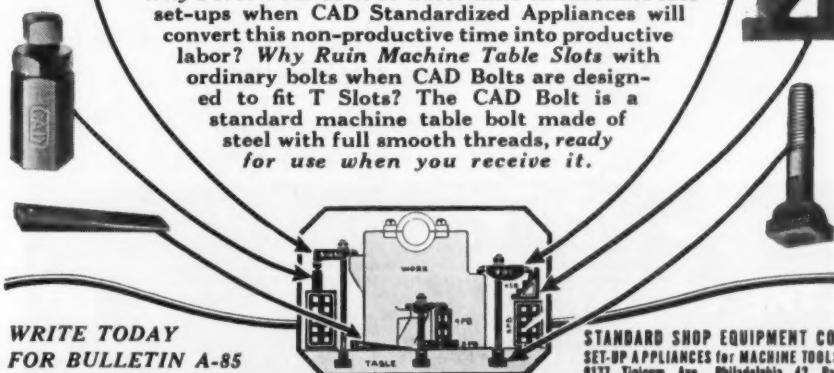
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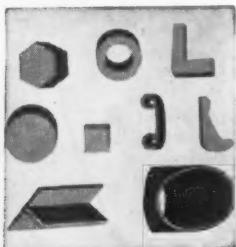


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